REPORT

ON

DOURINE IN DIFFERENT BREEDS OF EQUINES,

TOGETHER WITH

AN ACCOUNT OF VESICULAR EXANTHEMA AND PYROPLASMOSIS WHICH OCCURRED AS COMPLICATIONS.

BY

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WITH SIXTEEN ILLUSTRATIONS.

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PHOTOGRAPHS

Showing certain symptoms in animals the subjects of Dourine Vesicular Exanthema and Surra, with descriptive accounts of the features noted in each plate respectively.

Plate No.	Name.	Breed.	Date of Photograph.	Description of plate.
			DOURINE.	
I	Shamsher .	Arab .	6th February 1903.	Showing œdema on under-surface of abdomen spreading forward, together with certain cutaneous plaques.
	Œdema of belly.			
II	Shamsher .	Arab	12th March 1903.	Plaque No. 5 disappeared on the 16th February 1903. It measured 6″ × 2″, urticarial or œdematous in type.
	Cutaneous plaque.			
III	Monarch .	Arab .	2nd February 1904.	Showing globular and everted condition of the mucous-membrane of the meatus-urinarius on the 275th day after the infective covering, May 9th, 1903.
	Everted m. m. of meatus-urinarius.			
IV	Mare III .	Australian .	30th April 1903.	Unilateral enlargement of the left labium pudendi on the 14th day after scarification, etc.
	Unilateral swelling of vulva.			
V	Mare III .	Australian .	17th June 1903.	Showing various plaques on the right hip, croup and left ribs. Eight plaques and three accessory ones appeared on this date —*Vide* Report Appendices, Mare III.
	Cutaneous plaques in early case of Dourine.			
VI	Mare III .	Australian .	28th September 1903.	Leucoderma of vulva following inoculated Dourine. The first patch of leucoderma appeared on the 57th day after inoculation, no symptoms of vesicular exanthema having been manifest.
	Leucoderma of vulva.			
VII	Mare IV	Australian .	1st May 1903.	Œdema involving the tissues on either side of the vulva and spreading down the thighs to perineum on the 46th day after scarification and inoculation of vulva with Dourine plaque blood.
	Œdema involving tissues surrounding external genital organs spreading to perineum.			

Plate No.	Name.	Breed.	Date of Photograph.	Description of plate.
VIII	Mare VII *Œdematous plaque showing raised ring at circumference with flat area within.*	Country-bred	5th September 1903.	Plaque No. 4 situated over right ribs appeared on the 27th August and disappeared on September 9th, 1903, after persisting for 13 days. The plaque appeared as an urticarial or œdematous patch 1·0 inch in diameter, between the 27th August and 4th of September, it increased to 4·5 inches in diameter and presented a well marked circumference.
IX	Yadgir *Ulcer on penis.*	Arab	9th May 1903	The ulcer appeared on the 8th May 1903, involving the m. m. on the anterior surface at the root of the free portion of the penis. It persisted for some days and finally healed on the 20th May 1903. No trypanosomata were found on microscopical examination of scrapings from the ulcer.

VESICULAR EXANTHEMA.

Plate No.	Name.	Breed.	Date of Photograph.	Description of plate.
X	Mare II *Leucoderma of vulva.*	Australian	1st February 1904.	Patches of leucoderma appeared on the external surface of the vulva on the 90th day following the primary covering, on separation of film-like scabs from the surface of the tissues. Appearance of the parts on the 271st day.
XI	Mare V *Vesicular Exanthema of vulva.*	New Zealand	3rd June 1903.	The eruption appeared on the 11th day and persisted until the 26th day after covering. Patches of leucoderma appeared on the 26th and 32nd day.
XII	Mare VII *Vesicular Exanthema of vulva.*	Country-bred	11th July 1903.	Infective covering on 3rd July 1903, vaginitis followed within 24 hours, photograph taken on 9th day. On the 12th day ulcers formed and on 17th day some scabs separated, leaving patches of leucoderma.
XIII	Mare VII *Leucoderma of vulva.*	Country-bred	30th January 1903.	Condition of the vulva, showing patches of leucoderma on the 212th day after the infective covering.

Plate No.	Name.	Breed.	Date of Photograph.	Description of plate.
XIV	Mare VIII	Country-bred	1st February 1904.	Condition of the vulva, showing patches of leucoderma on the 211th day after the infective covering.
	Leucoderma of vulva.			
	SURRA.			
XV	Pony IX	Country-bred	31st January 1904.	Showing everted condition of mucous-membrane of meatus-urinarius in an animal which succumbed to Surra on the 19th day following inoculation with a trace of blood containing the trypanosoma.
	Everted m. m. of meatus-urinarius.			
	DOURINE.			
XVI	Vendor	Australian	30th June 1904.	*Vide* Appendices.
	Paraphymosis a symptom of Dourine.			

REPORT

ON

DOURINE IN DIFFERENT BREEDS OF EQUINES.

Section I.—INTRODUCTION.

FROM observations made during one of my tours in the autumn of 1898, I came to the conclusion that certain symptoms exhibited by a country-bred mare pointed to the fact that she might be the subject of covering disease. Consequently, on my return from sick leave, I prosecuted enquiries with regard to the existence in India of the above mentioned malady, and in my letter No. 271, dated 24th April 1900, to the Secretary to the Director-General, Indian Medical Service, requested that information might be forwarded to me with regard to the occurrence of a disease in stallions and mares known under the name of Dourine or 'Mal du Coit.'

The Department of Revenue and Agriculture, in their letter No 815—76-2, dated the 9th June 1900, signified the following order:—"The necessary instructions have been issued to the Inspector-General, Civil Veterinary Department, and the Principal Veterinary Officer in India to keep Dr. Lingard informed, from time to time, of the occurrence of any case or cases of a certain disease 'Dourine' allied to Surra, as well as any information that may be obtainable concerning them."

The first case recognized by me was that of a stallion *Quarter* Arab at Babugarh in July 1901. Inoculation experiments conducted on small animals, in the absence of equines, with blood from the plaque and from the general circulation proved negative, but useful photographs were secured of an animal in the second stage of the disease showing the eruption of plaques. As the Bareilly Depôt had at that time not been taken over, and there existed no arrangements for keeping horses under observation for long periods, no further head-way could be made with the investigation at that date.

During the latter half of 1902, a widespread epizootic of the disease came to light, especially in the Punjab and certain districts in the United Provinces bordering on the eastern bank of the river Jamna.

The following report deals with Dourine as observed respectively in English and Australian thorough-breds and in Arab stallions, which exhibited the disease in Chronic, Latent, and Recent forms. In addition, experiments with regard to the intimate etiology and pathology of the disease have been carried out in Australian, Country-bred, and New Zealand mares, while in stallions an Arab horse, country-bred tats, and country-bred donkeys have been utilized for the purpose.

My best thanks are due to—

Colonel J. W. A. Morgan, Inspector-General, Civil Veterinary Department, for animals received from Babugarh.

Colonel H. Goad, Director-General, Army Remount Department, for cast mares from Saharanpur, Karnal, and Hapur.

Major H. T. Pease, Principal, Lahore Veterinary College, for Dourine stallions and for valuable information with regard to the disease under investigation.

In the course of this report it is not my intention to deal with the geographical range of this disease, and other details which can be gleaned from books on the subject, but mainly to put on record the course of the malady as observed in equines, etc., of different breeds in this country, and give a short summary of the life history of the trypanosoma so far as our investigations have allowed us to determine in the multiplicity of other researches and routine duties. A detailed account of the trypanosoma will be published separately. I would here mention that on embarking on this enquiry it was hoped that one disease, and one disease only, *viz.*, Dourine, would have been encountered, but on having to write an account of the experiments carried out, one finds it necessary to give details of two other forms of disease, one which complicated the majority of in mares and at least one stallion dealt with in the course of this inquiry, while the other attacked all the animals utilized indiscriminately. The first to make its appearance was an infectious sexual disease known as *Vesicular Exanthema* of horses which occurs in some countries in epizootic form. Severe cases of this disease were formerly the frequent cause of Vesicular Exanthema being mistaken for Dourine. The second form has not before been recognized in horses in the East, *viz.*, *Pyroplasmosis.* The organism found in the red corpuscles of affected equines is akin to, but not identical with, that which produces hæmoglobinuria in cattle generally known as Texas fever. In the attached Appendices will be found a brief summary of each case of spontaneous and experimental Dourine in equines, together with the symptoms of Vesicular Exanthema as they appeared in each case respectively, but at the end of the report a short account dealing with each of the secondary diseases encountered, *viz.*, Vesicular Exanthema and Pyroplasmosis, has been inserted for information.

Section II.—PRECIS OF CASES.

Spontaneous or naturally contracted Dourine in Stallions.

A.—Cases observed at the Babugarh Depôt on July 26th, 1901.

Quarter, Arab.—An Arab stallion, aged 8 years, on the 4th November 1896. This animal was sent to a stand at Kakrana on the 25th January 1897, and continued in good health until January 1900, when it was brought back to the depôt for treatment. It then exhibited swelling and œdema of the sheath and hind limbs, which was considerably reduced after exercise. In April 1900, after a short course of treatment, the animal was sent back to the district, but had shortly to be returned to the depôt for rest and treatment. On this occasion, the horse was submitted to a course of tonics and Arsenic, but not the slightest good effect was observed. The temperature during this long period ranged between a minimum of 99·8°F. and a maximum of 103·2°F. There was a history, since the 27th April 1900, of numerous plaques having appeared at intervals of 15 to 20 days; these persisted for several days and then disappeared, leaving the hair on the affected area of a lighter colour.

On July 26th, 1901, there was great enlargement of the sheath and scrotum; tissues much thickened, no sores or cicatrices were found on the surface of the penis, and there was no discharge from the urethra, but the mucous-membrane of the meatus-urinarius was everted and globular, and of a rose-pink colour. One oval plaque raised in semi-circular form round the border with a flat area inside was present on the right side over the skin covering the ribs. The animal fed well, and no falling-off in the appetite was observed during the course of the case. On 26th July 1901, 8-20 A.M., the horse was destroyed according to orders received by the Superintendent, Civil Veterinary Department, and a *post-mortem* conducted. The blood of the plaque was microscopically examined in the open, and inoculation experiments of a dog and rabbits made, but negative results followed.

Syntax.—A thorough-bred Australian stallion, aged 13 years, purchased in September 1896. This animal was stationed at Cherawak from October 1897 to 1900, during which latter year he returned to the depôt (Babugarh, United Provinces) for rest and later was sent to Serval. On being sent back to the depôt, there was swelling and œdema of the sheath, but no plaques had made their appearance. Animal under treatment.

Prime Minister.—A thorough-bred English stallion, aged 7 years, was landed in November 1899, and after remaining for a period of a year at the depôt at Babugarh, United Provinces, to get accustomed to the climate, he was sent out to the stand at Cherawak in October 1900. On the return of the horse to the depôt on the 1st July 1901, there was considerable swelling and œdema of the sheath. Animal under treatment.

B.—Animals which were placed under continuous observation at the Laboratory.

No. I.—Shamsher, a bay Arab stallion, 14-1½, age 8½ years, on 1st December 1902, was landed in Bombay on 15th December 1898. Between 13th March 1899 and 8th October 1902, contracted Dourine while covering mares in the Jhelum district. On the latter date, was admitted to Veterinary College, Lahore. Animal then in good condition, looking well, with the exception that the scrotum was enlarged and suppurating, and the external inguinal glands were also enlarged, the condition being similar to thorough-bred English horse *Harden* under observation for two months, and treated for a time with Arsenic and Nux Vomica. Return of plaques and other symptoms when treatment discontinued. Presence of Trypanosoma demonstrated in blood from plaques, but not in that drawn from the general circulation. After arrival at the Imperial Bacteriological Laboratory at Bareilly, submitted to a further period of observation for 15 months, during which time additional manifestations of the disease were observed, including eruption of 18 plaques, swelling and œdema of the sheath, scrotum, and under-surface of the abdomen, etc.

No. II.—Kilngarth, a brown thorough-bred English stallion, 15-1½, 14 years old in December 1902, was landed from England in 1893, and remained in the North Punjab. On 10th December 1902, at the Stud Farm of the 18th Bengal Lancers, covered a country-bred mare No. 1130, Stud No. 50, which latter was found at a later date to be the subject of well-marked Dourine. Early in January 1903 swelling of sheath observed, but on the 6th February the condition of the animal was excellent. Between the 11th and 19th of the same month first plaque observed by Veterinary Officer. Animal admitted to the Punjab Veterinary College presenting the following symptoms: swollen sheath, end of penis œdematous, no typical patches on skin, but traces of recent patches on the quarters. Between arrival of the horse at Lahore and its despatch on the 29th March 1903 eruption of some eleven patches on various parts of the body; trypanosoma repeatedly demonstrated in blood drawn from one or other of the patches. Arrival at Imperial Bacteriological Laboratory on March 31st, 1903. Eruption of forty-one patches between 3rd April and 25th December 1903, for the most part invading both sides of the neck and crest. Absence of enlargement of the submaxillary and external inguinal glands; but recurring scrotal abscesses, which formed and suppurated at intervals. Atrophy and retraction of testes, alternate augmentation and diminution of the œdema affecting sheath and scrotum.

No. III.—Yadgir, a chestnut Arab stallion, 14-3¼, age 14 years, was landed in Bombay on 2nd November 1892, and remained in the United Provinces. In August 1902 swelling of sheath and scrotum, but no other symptoms reported. Treated in depôt with Arsenic and Nux Vomica. Considerable improvement in condition, body weight 902 lbs., the horse was returned to the district in December 1902. In March 1903 the animal was sent for to the depôt, body weight 845 lbs., sheath and scrotum much larger than before, but no cutaneous patches. Animal despatched to Imperial Bacteriological Laboratory, Bareilly, 29th, and arrived 31st March 1903. Eruption of two plaques in Bareilly up to the 10th April, and after arrival in Muktesar on 13th further eruption of twenty-nine plaques during the following six and a-half months. Returned to Bareilly November 17th. Further eruption of seven plaques between latter date and 22nd February 1904. Ulcer on penis appeared on the 8th and persisted until 20th May 1903, when it healed. Thick muscular ring formed in sheath at the root of the penis on 29th June, but disappeared without producing severe symptoms. Left external inguinal glands enlarged, persistence for several months; submaxillary glands not involved. Testes became hard, right more so than left; six months later both irregular in form and harder than normal. Eruption of disseminated urticaria on several occasions; after persisting for variable periods it disappeared. Œdema of sheath varied more or less in amount during the period of observation, but after the animal had been used for the purposes of covering, the symptoms always increased in severity. Absence of cerebro-spinal symptoms up to March 1904.

No. IV.—Vendor, a thorough-bred Australian stallion, about 15-2, aged, received at Imperial Bacteriological Laboratory, Bareilly, from Babugarh Civil Veterinary Department Depôt on 31st March 1903. Horse used for stud purposes in the district. Received at depôt for summer rest in July 1901, suffering from debility, loss of weight, enlargement of scrotum and sheath and swelling of the hind limbs. Treated with Iodide of Iron and Nux Vomica, regular exercise. Apparent recovery, used for stud purposes from October 1901 to July 1902. On return to depôt presented symptoms of advanced Dourine. Treatment, Mercuric Perchloride and Potassium Iodide. General improvement and recovery conjectured; showed no symptoms of ill-health during a period of ten months. In June 1903 put to a mare suffering from Dourine in order to test whether a relapse would take place or a fresh infection be brought about. On the eighth day following the primary covering paraphymosis appeared and on the eighteenth a cutaneous plaque, in blood drawn from which the trypanosoma was found. During the next twelve weeks seventeen further plaques made their appearance, together with eruptions of disseminated urticaria at intervals. Œdema of the throat extending to the chest, followed by weakness and later loss of power over the hind quarters, hæmoglobinuria and death.

Experimental cases of Dourine in Equines and small animals.

*Mare I.**—Covered by Arab stallion *Shamsher,* the subject of chronic Dourine. Disease not communicated. Six weeks later served by a second horse *Kilngarth* (thorough-bred English), the subject of more recent disease. After further period of three weeks, congestion of vaginal m. m. observed and first cutaneous plaque appeared 30 days after union with second horse. Appearance of 27 plaques and several distinct eruptions of disseminated urticaria during a period of 20 weeks. Swelling and œdema of vaginal m. m. which later extended to perineum and udder. Swelling and hardening of submaxillary glands. Sexual excitement more or less present during whole period the disease lasted. Weakness followed later by complete loss of power over hind quarters. Trypanosomata frequently found in the blood of the plaques, but never free in that of the general circulation. Vaginal secretion, although frequently examined, never revealed the presence of the protozoon. Course of disease from date of covering by *Kilngarth* until that of death, 175 days. Mare covered on several occasions during June 1903 by apparently healthy horse *Vendor,* but no external genital manifestations of the disease followed in the mare as a result of the union.

Mare II.—Covered by Arab stallion *Yadgir,* subject of the latent form of Dourine, symptoms of which had suddenly become active. Appearance on 10th day following covering of vesicles and ulcers on left labium pudendi and later by œdema of vaginal

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* Mares Nos. I to IV inclusive were Australians.

m. m. and other minor symptoms. Trypanosoma discovered in vaginal mucus on 34th day, persistence of protozoon at intervals during many months. Eruption of but four cutaneous plaques between the 116th and 284th days, with two intermissions lasting 34 and 134 days respectively. Absence of cerebro-spinal symptoms during 295 days after covering.

Mare III.—Scarification of minute portion of mucous-membrane of left labium vaginæ with a needle, and inoculation of trace of fresh blood obtained from a Dourine plaque on English thorough-bred stallion *Kilngarth.* Appearance on 12th day of vesicle followed by a small ulcer, which readily healed. Swelling and œdema of L. labium, which later involved whole external genitals and perineum. Vaginal mucus contained the trypanosoma of Dourine. A leucodermic area appeared on the vulva on the 57th day after the separation of film-like scab. First plaque appeared on the 31th day following inoculation, in the blood of which trypanosomata were found on microscopical examination, followed at intervals, during a period of 117 days, by successive crops of plaques, numbering 80 in all, which involved the skin of the body and neck. Slight enlargement of the submaxillary glands. Weakness, later dragging of the hind limbs whilst walking. Swelling and suppuration of near hind limb. Inability to stand. Destruction. *Post-mortem.* Course of the disease 60 days.

Mare IV.—Scarification of m. m. of R. labium pudendi, and inoculation of trace of fresh blood obtained from a Dourine plaque on English thorough-bred stallion *Kilngarth.* Tumefaction of both labia on 15th day, and œdema of perineum. Absence of the trypanosoma from vaginal mucus. First plaque appeared on 70th day following inoculation (presence of trypanosomata demonstrated) followed at intervals during a period of 105 days by successive crops of plaques, numbering 18 in all, which involved the skin of the body and neck. Slight enlargement of maxillary glands. Gelatinous infiltration of subcutaneous and deep structures in various parts of the body. Stiffness, later dragging of the hind limbs whilst walking. Amelioration of symptoms, considerable improvement in condition. Further eruption of a plaque after intermission lasting 97 days.

Mare V.—New Zealand mare, covered twice within 48 hours by *Yadgir*, and Arab stallion, the subject of Dourine, exhibiting a sore on the anterior superior surface of the free portion of the penis. Vesicular eruption, ulcers on labia vaginæ followed by leucodermic patches. Swelling and œdema of external genitals and perineum, latter tissue around anus involved. Vaginitis and mucopurulent discharge. Appearance of the trypanosoma in the blood obtained from vaginal petechiæ. Absence of the protozoon from vaginal mucus during the whole course of the disease. Complete absence of cutaneous plaques, urticaria or eruption of any kind. Symptoms of paraplegia developed suddenly, inability to stand. Death. *Post-mortem.*

Mare VI.—Country-bred mare covered by Arab stallion *Monarch*, subject of Dourine, during early period of eruption of cutaneous manifestation, but absence of sores from penis. No eruptions of vesicles or other eruptions implicating vulva or vaginal m. m. First plaque appeared on 31st day following primary covering (trypanosoma), followed at irregular intervals by successive crops of plaques, which involved the skin of the body and neck principally. Thickening of labia-pudendi, followed by œdema of udder and later by œdema on under-surface of abdomen. Absence of leucodermic patches implicating tissues of vulva, anus, and udder, as also of nervous symptoms up to the 235th day after covering, with the exception of stiffness of the right hind limb.

Mare VII.—Country-bred mare covered by Arab stallion *Monarch*, the subject of recent Dourine. Appearance of Vesicular Exanthema (coital), later followed by leucoderma of the cutaneous parts affected. Eruption of first plaque on the 24th day after covering. Presence of trypanosoma in blood drawn from first plaque. Eruption of ten plaques in all during 160 days. Presence of the trypanosoma in blood drawn from first plaque. Eruption of ten plaques in all during 160 days. Presence of the trypanosoma in vaginal mucous on the 50th day and persistence at intervals during whole course of observation lasting 8 months. Absence of weakness across the loins or other cerebro-spinal complications up to the 230th day after primary covering.

Mare VIII.—Country-bred mare covered by Arab stallion *Monarch*, the subject of recent Dourine. Appearance of Vesicular

Exanthema (coital), later followed by leucoderma of the external affected parts. Eruption of first cutaneous plaque on thirty-third day after covering (trypanosoma discovered), followed during ensuing three and half months by 18 similar patches. Vaginal mucus contained trypanosomata in large numbers on the 17th day and at varying intervals up to 4 months after eruption of last plaque. Absence of cerebro-spinal complications up to 212th day after covering.

Monarch, a bay Arab stallion, age 5¼ years, 14-1½, was landed in Bombay in November, and received at Babugarh on 2nd December 1902. The animal was cast for cataract on the 29th and received at the Imperial Bacteriological Laboratory at Bareilly on the 31st March 1903. This horse was allowed to cover mare No. III on the 4th-7th May, the latter animal having been inoculated eighteen days previously on the m. m. of the left labium-pudendi with a slight trace of blood, drawn from a cutaneous plaque on *Kilngarth* (spontaneous Dourine). At the time of covering the mare presented swelling of left labium, and the trypanosoma was discovered in small numbers in the vaginal mucus. The first important symptom exhibited by *Monarch*, *viz.*, thickening of the sheath, appeared on the 3rd June and was followed by the eruption of plaques on the 6th; from this latter date until the 15th February 1904 a succession of subcutaneous plaques made their appearance during the interval of nearly 9 months, while concurrently the general manifestations of Dourine were respectively observed. During the early part of the month of February 1904 the animal suffered from malaise and frequently assumed the recumbent position during the day-time. On the 20th porter-coloured urine was passed on one occasion only and red blood corpuscles found in the sediment on microscopical examination. On the 25th there was some weakness in the hind quarters, but this was only noticeable on the removal of the animal from its stall, the first thing in the morning. Continued pressure over the lumbar region made the animal crouch and almost fall to the ground.

Donkey III.—A small entire country-bred, aged 3½ years, received at Muktesar from Bareilly district on 31st July 1903. Body temperature varied between 37·6°C. and 98·0°C. during period of observation. Inoculated subcutaneously on August 4th 1903 with 15·0 c.c. of blood drawn from jugular vein of the Arab stallion *Monarch* during the interval between two paroxysms. A diffused swelling followed the inoculation at and around the seat of injection, but this had entirely disappeared by the morning of the 8th. After an interval, during which period not even thickening could be felt, a swelling, hard, warm and tender on palpation, became apparent at the seat of inoculation and the temperature rose 2·6°C. During the two following days the swelling decreased, but thickening remained at the seat of inoculation and persisted until the 6th September 1903. The first symptom of Dourine was the secondary swelling, which appeared at the seat of inoculation on the 13th day. At the same time the trypanosomata were discovered on microscopical examination of the blood drawn from the swelling. The eruption of the first plaque took place on the 33rd day, and the tenth and last on the 50th day. Up to February 29th, 1904, the 210th day following inoculation, no further symptom of the disease had become manifest, except that the mucous-membrane of the meatus-urinarius was everted.

Donkey No. I.—A small country-bred donkey mare, aged 5 years, was inoculated subcutaneously with 20 c.c. of blood drawn from general circulation of *Monarch*, during an intermission on the 226th day after the date of the first covering. The primary swelling at the seat of injection was absorbed within eleven days. This was followed by a period of rest lasting eight days, during which no changes were observed. Then a secondary swelling made its appearance, hot and red in colour, which after 82 hours attained a size of 9 × 4·5 × 0·75 inches. The trypanosoma was observed in the fluid drawn from the tumour. The swelling disappeared in the course of ten days from the onset, but slight thickening of the skin persisted for a further period of nineteen days. Up to the 84th day no other symptom of Dourine was observed.

Donkey No. IV.—A small entire donkey, country-bred, aged 7 years, was subcutaneously inoculated with 15 c.c. of blood drawn from the general circulation of *Yadgir* during an intermission on the 51st day of one lasting 53 days in all. The primary swelling at the seat of injection was absorbed within four days.

On the fifth day a secondary swelling developed, which attained its maximum size in forty-eight hours, it was tense and tender on manipulation. Absorption had taken place and only a thickening remained on the fifth day after its second appearance. Eversion of the m. m. of the meatus-urinarius followed, but no other symptom of Dourine was developed up to March 1904.

Pony No. II.—A country-bred pony mare, aged, was inoculated subcutaneously with 10 c.c. of blood drawn from the general circulation of *Shamsher* during an intermission. Primary, but no secondary swelling followed. Fifty-one days later, the pony was re-inoculated subcutaneously with 2 c.c. of blood from plaque No. 3, *Shamsher*. The trypanosoma was demonstrated in the injected blood. Negative results.

Pony No. III.—A country-bred pony mare, aged, was subcutaneously inoculated with 20 c c. of blood drawn from the general circulation of *Shamsher* during an intermission. Primary, but no secondary swelling followed inoculation. Fifty-one days later the animal was re-inoculated subcutaneously with 20 c.c. from the general circulation of *Shamsher*. Negative results followed.

Pony No. VI.—A country-bred pony mare, aged 8 years, was inoculated subcutaneously with 21 c.c. of blood drawn from the general circulation of *Shamsher* during an intermission. Considerable swelling followed the injection, but by the fifth day all had been absorbed. During the following three months no symptom of Dourine was developed.

Pony No. VII.—A country-bred pony mare, aged 3½ years, was inoculated subcutaneously with 27 c.c. of blood drawn from the general circulation of *Kilngarth* during an intermission. The swelling at the seat of injection was absorbed by the fifth day. During the following three months no symptom of Dourine was developed.

Bull No. I.—Plains bull, aged 2 years, of mixed breed, from the Bareilly district, was subcutaneously inoculated with 20 c.c. of blood drawn from the general circulation of *Monarch* on the 283rd day after the primary covering. No swelling or œdema followed at the seat of injection, and no symptom of Dourine was developed.

Dog No. I.—A pariah puppy, aged 4 months, was inoculated on several occasions, but always with negative results.

(i) Subcutaneous inoculation with 0·5 c.c. of blood drawn from plaque No. 2 *Shamsher.* Trypanosoma present.

(ii) Subcutaneous inoculation with 10 c.c. of blood from general circulation of *Shamsher.* Few hours after eruption of plaque.

(iii) Subcutaneous inoculation with 1·5 c.c. of sero-sanguinous fluid from œdematous swelling on the under-surface of the ábdomen of *Shamsher.*

Dog No. II.—A pariah puppy, aged 4 months, was subcutaneously inoculated on several occasions, but in each instance with negative results.

(i) Subcutaneous inoculation with 5 c.c. of blood from the general circulation of *Shamsher* during intermission between plaques Nos. 2 and 3.

(ii) Subcutaneous inoculation with 0·45 c.c. of blood from plaque No. 4 *Shamsher.* Trypanosoma present.

(iii) Subcutaneous inoculation with 1·0 c.c. of blood from plaque No. 5 *Shamsher.* Trypanosoma present.

(iv) Subcutaneous inoculation with 1·0 c.c. of blood from plaque No. 7 *Shamsher.* Trypanosoma present.

Dog No. III.—A young pariah dog, was inoculated subcutaneously with 10 c.c. of blood drawn from the general circulation of *Kilngarth.* Trypanosoma present in the plaques, which persisted at the time of the collection of blood. The dog was kept under observation for a period of six months, daily microscopical examination of the blood being made, but with negative results. Body weight of the animal increased from 29 to 34 lbs. during the period of observation.

Dog No. IV.—A young pariah dog, was inoculated in the anterior chamber of the eye with 4 drops of blood drawn from plaque No. 12 (*c*) *Kilngarth.* Trypanosoma present. No symptoms of Dourine developed during the following six months. Blood examined microscopically daily. Body weight of the animal increased during the period of observation from 26 to 34 lbs.

Rabbit I.—A white rabbit, body weight 953 grammes, was subcutaneously inoculated with 4 c.c of blood drawn from general circulation of *Kilngarth*. Blood examined for four months, no symptoms of Dourine supervened. Body weight increased to 1920 grammes.

Rabbit II.—A white and black, body weight 1440 grammes, was inoculated in the anterior chamber of the eye with 0·2 c.c. of blood drawn from plaques No. 12 (*c*) *Kilngarth*. Trypanosoma present. No symptoms observed until the 49th evening after inoculation, when temperature registered 39·0° C. followed by 41·3° C. on the 50th morning. Death on the 53rd day. Trypanosoma present in very small numbers in blood of general circulation. Increase of 90 grammes in body weight during period of observation.

Guinea-pig No. I.—Body weight 603 grammes, was subcutaneously inoculated with three drops of blood containing the trypanosoma, drawn from plaque No. 12 (*c*) *Kilngarth*. Daily microscopical examination of the blood during a period of over 6 months failed to reveal the presence of the trypanosoma in the general circulation. Body weight 700 grammes.

Section III.—FACTS BEARING ON THE ETIOLOGY OF DOURINE.

(I) *Period of incubation in Dourine.*—It is a most difficult matter to accurately determine the period of incubation in spontaneous cases of this disease, that is the period which elapsed between the first covering or inoculation of the vulva and the appearance of the primary symptoms. In some cases, an external manifestation, such as the sudden enlargement of one or both of the labia-pudendi, is noticeable, but in others no such symptom is exhibited. From our previous investigations with the trypanosoma of Surra, we know that in some animals a distinct tumour may form at the seat of inoculation and may persist until the trypanosoma escapes into the general circulation of the animal, but on the other hand no such local change need take place at the seat of inoculation, and yet the animal becomes the subject of the generalized disease in due course after a period of 4 to 7 days.

The primary or spontaneous cases of Dourine in stallions have helped us but little in forming an opinion regarding the period of incubation, as notes of course are not kept or information forthcoming with regard to the symptoms exhibited by the great majority of animals when in the district.

The experimental cases in mares, however, have brought forward some interesting facts, and these show that, if we have any cause to suspect the presence of Dourine in any given equines, we ought to be on the alert any time between 10th and 50th day after the date of the primary covering. According to one observer, symptoms may appear on the eighth day, so that in a country where the disease is enzootic, it would be more than advisable to keep a careful watch from the date of covering. In some of the experimental cases here brought forward the primary symptoms have been more or less marked by being complicated with Coital Exanthema; but as this secondary infection may complicate any covering, it is of interest to note how far Vesicular Exanthema may be the means of cloaking the symptoms of Dourine in the early stages of the latter disease.

If we analyse the symptoms of uncomplicated Dourine in mares which may appear in the early stage between covering or inoculation and the eruption of the first cutaneous plaque, we find several which convey information and help towards coming to a diagnosis.

These are (i) Congestion of the vaginal m. m. together with the formation of a vesicle, or vesicles, which later form ulcers on the affected part or on the mucous-membrane of the internal surface of the labia-pudendi.

(ii) Unilateral or bilateral tumefaction of the labia more or less persistent.

(iii) Swelling and œdema of the vaginal mucous-membrane producing a patent condition of the vulva during the period for which it persists.

When all these three symptoms are present, it would lead one to suspect that we might have to do with a case of Dourine, and a careful watch should be maintained for further symptoms. It frequently happens, however, that only one or two of these symptoms are developed, as for instance in the cases of the following animals:—

Mare I exhibited symptom No. (ii) only.
„ II „ „ No. (i) only.
„ III „ „ Nos. (i) and (ii).
„ IV „ „ Nos. (i), (ii), and (iii).

While in mare No. VI tumefaction of the vulva followed 24 hours after the eruption of the first plaque, and in mare No. V, although the submaxillary glands were enlarged and on the 49th day increased swelling and œdema of the labia occurred, there was a total absence of plaques.

When Coital Exanthema makes its appearance in mares, it is next to impossible to make any certain diagnosis with regard to the presence of Dourine until the primary disease has run its course and disappeared, or until the trypanosoma has made its appearance in the vaginal mucus. In stallions, unless attention is directed to an abnormal condition of the free portion of the penis or to that of the meatus-urinarius, it is more than probable that the first symptom to attract attention will be the thickened condition of the sheath, which may be absent one evening but manifest on the following morning.

TABLE I

Showing the length of the period of inoculation in experimental animals, that is the period which elapsed between the first covering or inoculation, and the primary symptom referable to Dourine.

Animal.	Breed.	Covered or inoculated	Name of horse or number of mare.	Date of covering or inoculation.	Date of primary symptoms	Day following covering or inoculation.	Day after covering or inoculation first plaque appeared.	REMARKS.
				1903.	1903.			
Mare I	Australian	Covered	*Kilgarth*	April 3rd	April 26th	18th-23rd	30th	April 24th, Vaginal m. m. red. April 26th, R. labium swollen.
,, II	,,	,,	*Yadgir*	May 7th	May 16th	10th	46th	May 16th, small ulcer on labium. Tryp. in vagl. mucus 30th day.
,, III	,,	Inoculated	*Kilgarth*	April 17th	April 28th	12th	34th	April 27th, vagl m. m. congested. April 28th, vesicle and L. labium swollen.
,, IV	,,	,,	,,	April 17th	April 29th	13th	70th	April 26th (10th day), vagina injected. April 29th (13th day) R. labium tumified. May 1st (13th), vaginal m. m. œdematous.

TABLE I—*contd.*

***Showing the length of the period of inoculation in experimental animals, that is the period which elapsed between the first covering or inoculation, and the primary symptom referable to Dourine*—contd.**

Animal.	Breed.	Covered or in-oculated.	Name of horse or number of mare.	Date of covering or inocula-tion.	Date of primary symptoms.	Day following covering or in-oculation.	Day after covering or inocu-lation first plaque appeared.	REMARKS.
			*	1903	1903			
Mare V	New Zealand.	Covered .	*Yadgir* .	May 11th	June 28th	9th	*Nil*	No symptoms until 22nd—29th June. Trypanosoma found in blood from vaginal petechiæ.
" VI	Country-bred.	" .	*Monarch*	June 11th	July 11th *	1st	31st	No symptoms until appearance of first plaque. Thickening vulva followed first plaque 12th July.
" VII	"	" .	"	June 30th	July 23rd	24th	24th	Symptoms if any marked by those of Vesicular Exanthema.
" VIII	"	" .	"	July 5th	July 31st	27th	33rd	Do. Do. 31st vulva became thickened and genital gland enlarged.
Monarch	Arab .	" .	Mare III	May 4th	June 3rd	29th	34th	Thickening of sheath appeared on the 29th day.
Donkey III.	Country-bred.	Inoculated	*Monarch*	Aug 4th	Aug. 16th	13th	33rd	Secondary swelling at seat of inoculation 18th day after inoculation Trypanosoma in fluid of swelling.

* Subject of Vesicular Exanthema.

(II) *Period between covering or inoculation and appearance of first plaque.*—This period is variable both in stallions and mares, but more particularly so in the former, and as the eruption of plaques is the most important clinical symptom in all cases, so the presence of swelling of the sheath in males can only make one suspect the nature of the disease, but confirmatory proof is necessary before an accurate diagnosis can be arrived at. Until the eruption of plaques we may be certain in the very great majority of cases of Dourine in equines that the disease has not become generalized, but the "materies morbi" is lying dormant in some part of the body, waiting to become active whenever the state of the system may become favourable for its further development. In some animals the disease has been known to remain latent for more than 12 months and in the cases of *Vendor,* thorough-bred Australian, and *Yadgir,* an Arab, it would appear probable that periods verging upon 10 months had been passed through without further symptoms being developed. On the other hand, on reference to Table No. II it may be observed that in *Monarch's* case only 34 days elapsed between the date of covering mare III and the appearance of well-marked cutaneous lesions. The following experimental cases in equines may be divided into two series:—

(*a*) Those in which the disease was communicated from diseased to the healthy animal, male or female, during covering.

(*b*) Subcutaneous inoculation of blood drawn from a plaque or the general circulation of an affected animal:

The results were as follows:—

(*a*) Of five mares covered respectively by an English and Arab stallion the interval between the date of covering and the appearance of the first plaque occupied 30, 32, 24, and 33 days respectively, while in the 5th mare the interval which elapsed was 110 days.

(*b*) Two mares were inoculated with blood taken from a plaque (*Kilngarth* No. 12) within a period of 15 to 20 minutes of each other. Mare III received the primary blood collected after a small incision had been made in the plaque, whereas mare IV was inoculated with the second blood drawn later from the same incision. The former animal exhibited cutaneous plaques after a period of 34 days, while the latter occupied a period of 70 days before similar symptoms became apparent.

An Arab stallion *Monarch* and a country-bred donkey stallion were utilized for experiments; the former contracted the disease by covering, while the latter was subcutaneously inoculated with blood from the general circulation. The periods occupied between covering and inoculation respectively and the appearance of the primary cutaneous plaque occupied 34 and 33 days.

TABLE II

Showing the period which elapsed between covering or inoculation and the appearance of the primary cutaneous plaque.

Spontaneous Dourine.

Name of horse.	Breed.	Disease how contracted	From what mare.	Supposed dates of		Plaques appeared days after supposed date of contracting disease.	Number of plaques noted at Laboratory.	Number of days between first and last plaques.	Remarks.
				Contracting disease.	Appearance of plaques.				
Shamsher	Arab .	Covering.	?	...	...	...	...	?	Advanced disease, no previous history with regard to horse.
Kilngarth	T. B. English	,,	Mare 1130	10th Dec. 1901.	15th Feb. 1903.	67	52	314	First plaque observed by Superintendent about 14 days after first examination. "Syce mentions and describes patches on skin."
Yadgir	Arab .	,,	?	June 1902	3rd Apl. 1903.	315	38	309	Middle date between 10th March and 18th August 1903 at Masauta. Last plaque counted to February 1st, 1904.
Vendor .	T. B. Australian.	,,	?	Apl. 1901	July 1902	?	18	?	Latent symptoms of Dourine 1901, advanced Dourine July 1902, circular patches, weakness about loins. Plaques observed July to October 1903.

Experimental Dourine.

Number and sex of animal.	Breed	Covered or inoculated.	Name of animal by which covered or from which blood obtained.	Date of covering or inoculation.	Date on which first plaque appeared.	Interval between date of events in columns Nos 5 and 6.	Total number of plaques which appeared.	Interval in days between eruption of first and last plaque.	Result.	Remarks.
				1903	1903	Days.				
Mare I	Australian.	Covd.	*Kilngarth*	April 3rd	May 2nd	30	27	139	Death	Kilngarth, recent case of Dourine.
,, II	,,	,,	*Yadgir* .	May 7th	Aug. 13th	116	3	35	Survived.	Yadgir, latent, became active April 3rd, 1903.
,, III	,,	Inoc.	*Kilngarth*	April 17th	May 30th	34	80	147	Death	Inoculation with blood first drawn from plaque.

TABLE II—*contd.*

Showing the period which elapsed between covering or inoculation and the appearance of the primary cutaneous plaque—contd.

Experimental Dourine.

Number and sex of animal.	Breed.	Covered or inoculated.	Name of animal by which covered or from which blood obtained.	Date of covering or inoculation.	Date on which first plaque appeared.	Interval between date of events in columns Nos. 5 and 6.	Total number of plaques which appeared.	Interval in days between eruption of first and last plaque.	Result.	REMARKS.
				1903	1903	Days.				
Mare IV	Aust.	Inoc.	*Kilngarth*	April 17th	June 25th	70	19	203	Survived.	Inoculation with blood later drawn from same incision.
" V	New Zealand	Covd.	*Yadgir* .	May 11th	*Nil*	*Nil*	*Nil*	*Nil*	Death	*Vide* remark, mare II.
" VI	C. B.	"	*Monarch*	June 11th	July 11th	32	75	161	Survived.	*Monarch*, no ulcers on penis when mare covered.
" VII	"	"	"	" 30th	" 25th	24	10	159	"	*Monarch*, ulcers on date latter covering.
" VIII	"	"	"	July 5th	Aug. 8th	33	19	75	"	*Monarch*, ulcers on penis at time covering.
Monarch	Arab.	"	Mare III	May 4th	June 6th	34	82	185	"	*Monarch*, healthy clean horse.
Donkey III	C. B.	Inoc.	*Monarch*	Aug. 4th	Sept. 5th	33	10	18	"	Animal in apparent good health and condition.

Conclusions.—From the above experiments in several breeds of equines we may conclude that the period which elapsed between covering or inoculation and the appearance of the primary cutaneous plaque varied between 24 and 34 days, but in 6 out of 7 cases it was between 30 and 34 days. Further, the results show that an animal (mare No. V) need not of necessity exhibit any plaques and yet succumb to the disease.

(III) *The period of the disease during which the eruption of plaques takes place.*—In two out of three mares which succumbed to Dourine, the intervals during which the eruption of plaques took place were 138 and 148 days respectively. The third animal passed through a severe attack of the disease and succumbed without ever having exhibited this symptom.

As long as an animal survives, it is impossible to foretell whether in the natural order of events any further cutaneous manifestations will make their appearance. After having passed through the usual period of their eruption we know, however, that certain methods respectively, if resorted to, may probably act as exciting causes and bring about a further eruption of one or more plaques.

Of the animals which have come under our observation, in those which passed through the disease and have survived up to the present date, the period during which the eruption of plaques persisted for, varied considerably, as may be seen in the Table, but certain points may be drawn attention to in the different breeds.

In a thorough-bred English stallion the period was 313 days or more.
In an Arab stallion the period was 254 to 304 days.
In Australian mares „ „ 168 to 202 „
In country-bred mares „ „ 75 to 181 „
In a donkey „ „ 17 „

From these figures it would appear that donkeys are the least susceptible to the eruption of plaques, and that country-bred mares, Australian mares, Arab stallions, and thorough-bred English come respectively in the order put forward.

The following shows the period of the disease during which the eruption of plaques takes place :—

Kilngarth	from	67th	day after covering	until the	380th	day—interval	313 days.
Yadgir	„	232nd „	„	„	536th	„ „	304 „
Mare I	„	30th „	„	„	168th	„ „	138 „
„ II	„	116th „	„	„	284th	„ „	168 „
„ III	„	34th „	„	„	182nd	„ „	148 „
„ IV	„	70th „	„	„	272nd	„ „	202 „
„ VI	„	31st „	„	„	212th	„ „	181 „
„ VII	„	24th „	„	„	183rd	„ „	159 „
„ VIII	„	33rd „	„	„	108th	„ „	75 „
Monarch	„	34th „	„	„	288th	„ „	254 „
Donkey III	„	33rd „	„	„	50th	„ „	17 „

(IV) *Regions of the body on which plaques make their appearance.*—The commonest sites are the neck, sides of the chest, abdomen, croup and shoulders, occasionally on the extremities, submaxillary region and sheath. In some cases of Dourine, the eruption of plaques is more or less localized to some particular region, so that one may describe it as a neck or abdominal case. For instance, out of 41 plaques observed on *Kilngarth*, 30 appeared on the right and left-sides of the neck and crest. Again, there may be an equal distribution of plaques on each side of the body as in mare No. IV or one side may present more than the other. Of 440 cutaneous plaques which made their appearance on 13 equines (mares and stallions), the distribution with regard to the side of the body implicated was as follows :—

Right side 255 or 57·95 %
Left side 185 or 42·05 %

With regard to the question of sex we find of 206 plaques in *stallions* :—

Right side 111 or 53·88 %
Left side 95 or 46·12 %

Of 234 plaques in *mares* :—

Right side 144 or 61·54 %
Left side 90 or 38·46 %

In the human subject urticaria may invade the mucous-membrane of the tongue and some part, if not all, of the gastro-intestinal tract, but in equines no symptom of such complication has been observed, unless the slight but repeated attacks of colic may point to the existence of such a condition.

In many instances in the course of this disease, the formation of a plaque does not take place suddenly. A faint outline is first observed, giving an indication as to the size the plaque will assume, later one side only may become raised at the circumference or outer border, while the hair covering the implicated skin may stand erect. Probably in the course of several hours the plaque may become fully developed; but as the majority of plaques make their appearance and mature during the hours of the night, one usually observes the well-formed plaque only at the time of the morning visit.

(V) *Plaques.*—The plaques at the time of eruption and during the period of their persistence may assume a variety of forms of which the following are the most frequent :—

(i) *Shape.*—Circular flat like a disc of metal.
(ii) Circular or oval, meniscus form.
(iii) Circular or oval, with a slight depression in the centre.

(iv) Circular or oval, with flat area in the centre, the circumference only being raised.

(v) Irregular forms. Kidney-shaped. Semi-lunar. Triangular. Large circular patch surrounded by minute disseminated patches.

Of 443 plaques observed in 13 equines, 313 were circular and 130 oval or irregular in shape.

Dimensions.—In animals which exhibit but few plaques during this stage of the disease each one as it appears is generally fairly large and well-formed. On the other hand, when large numbers make their appearance singly or many at a time and at short intervals, the plaques are usually smaller, although they may considerably increase their dimensions within a period of a few days. The circular patches vary from 0·5 to 5 inches in diameter, whereas the oval and irregular-shaped forms were found to vary from a minimum of 0·75 by 0·5 to 8·0 by 5·0 inches. Plaques may appear singly at long intervals or several or many may become visible during a period of 12 to 24 hours.

A plaque may first appear as a small, round, hard elevation, 0·5 inch in diameter, and later develop into a perfectly-formed and circular one of 2·0 inches or more in diameter, or it may appear as a perfectly-shaped plaque and gradually go on increasing in size.

Sometimes two plaques spread and unite (*Monarch* Nos. 3 and 16), fusing together to form one large plaque.

An oval patch may, within a few days, increase in size, become kidney-shaped (*Yadgir* No. 38) and again later form a large circular plaque 4 to 5 inches in diameter.

A plaque may divide into two portions, each of which respectively later forms a perfectly-formed plaque.

Two small circular plaques situated near to one another may be enveloped by the formation of a third large one, which occupies an area beyond the limits of the two together (*Kilngarth* Nos. 9, 10, and 11).

A plaque may appear on one side of the crest and after persisting for some days suddenly spread and appear on the opposite side of the crest, the two persisting concurrently.

One half of a plaque may disappear and the other half persist or extend, increasing in dimension in the opposite direction.

A circular plaque 3·25 inches in diameter may persist for several (3) days and then assume a kidney-shaped form 1·5 by 0·5 inches previous to disappearing.

Exercise, as for instance walking uphill from the stable to the Laboratory, a distance of three hundred yards, sometimes was sufficient to make a recently-formed plaque fade and disappear within a period of one hour.

When a well-raised plaque which has persisted for a period begins to lose the meniscus form and become flat, or when a plaque commences to spread, it generally fades and disappears within a few days at most.

When a number of plaques appear at or about the same time (*Yadgir* Nos. 25—27), they not uncommonly fade and disappear on or about the same date.

The plaques which persist for the longest period are nearly always situated upon the neck or crest. The ratio of persistence of plaques on the neck to those on other parts of the body being as 2·5 to 1 respectively (*Kilngarth*).

Equines, the subjects of Dourine, which exhibit no plaques during the course of the disease, lose most in condition and more quickly than those which exhibit such symptoms.

(VI) *The length of the individual paroxysms and intermissions.*—Of the 14 experimental equines which contracted Dourine, two presented exact similarity with regard to the symptoms exhibited. The number of paroxysms varied from a total of 3 to 31 in the course of the disease. In all cases the shortest period occupied by a paroxysm was 24 hours and under, while the longest period observed was 4 days. The number of plaques which appeared during the persistence of paroxysms varied from a minimum of 1 to a maximum of 16. The number of intermissions in the animals which succumbed tallied with that of the paroxysms, while in those which survived they are one less than that total. The shortest period during which an intermission lasted was 1 day and the longest 138 days.

TABLE III

Showing the length of the individual paroxysms and intermissions in each class of animals, respectively.

Animal.	Breed.	Number of paroxysms.	Length of paroxysms in days		Greatest number of plaques during one paroxysm.	Number of inter-missions.	Length of intermissions.		Remarks.
			Shortest days.	Longest days.			Shortest days.	Longest days.	
Kilngarth .	T. B. English.	29	1	2	4	28	1	25	Stallions. The length of the intermission in animals which survived remains indefinite.
Shamsher .	Arab .	14	1	2	2	13	5	79	
Vendor .	T. B. Australian.	12	1	2	4	11	1	26	
Yadgir .	Arab .	26	1	2	3	25	1	53	
Mare I .	Australian	16	1	1	5	16	1	47	Experimental animals.
,, II .	,, .	3	1	1	2	2	34	138	
,, III .	,, .	26	1	4	9	26	1	14	
,, IV .	,, .	11	1	2	4	10	2	37	
,, VI .	C. B. .	31	1	3	8	30	1	29	
,, VII .	,, .	8	1	3	3	7	6	49	
,, VIII .	,, .	10	1	2	3	2	2	23	
Monarch .	Arab .	20	1	3	16	19	1	40	
Donkey III	C. B. .	5	1	3	5	4	1	6	

(VII) *Persistence of cutaneous plaques.*—Plaques in the great majority of cases appear but once, and after persisting for a longer or shorter time begin to fade and disappear slowly or suddenly, but in a number of animals a percentage of the plaques after an interval of a few days reappear on the same spot and frequently present a similar outline to that exhibited on the first occasion. After a varying number of days the plaque disappears for the second time, but may again, after a second short interval, make itself manifest for the third time. Details concerning points of interest in this connection with the several appearances of the plaques may be observed in the accompanying table. It must be understood that there is a difference between the course of the reappearance and the third appearance of a plaque within a few days of the disappearance of the first and second, and that of a totally new plaque which may appear later in the course of the cutaneous symptoms and occupy either a smaller or larger area than that previously taken up. This matter is mentioned for the reason that the pathological changes which take place in the two forms of plaques are different. The cause of a primary plaque is similar to that which may appear on the site of it at a much later date, while the cause of the ones which reappear on one or more occasions will be specially referred to later.

TABLE IV

Showing the shortest, longest, and mean duration of the primary plaques observed in each Dourine animal.

Animal.	Number of plaques in all.	Total period plaques persisted for days.	DURATION OF PLAQUES.			REMARKS.
			Shortest in days.	Longest in days.	Mean in days.	
Yadgir .	38	485	1	26	12 76	All plaques appeared after arrival at Bareilly and Muktesar.
Vendor .	16	133	2	18	8·31	History of plaques previous to arrival at Laboratory.
Kilngarth .	41	621	1	57	15·14	Eruption of plaques at I. B. Laboratory, primary not included.
Mare I .	27	135	1	48	5·0	Experimental animal.
,, II .	4	22	2	14	5 5	,, ,,
,, III .	80	629	1	26	7 86	,, ,,
,, IV .	19	91	1	11	4·76	,, ,,
,, V .	0	0	0	0	0 00	This animal exhibited no plaques.
,, VI .	75	540	1	23	7·20	Experimental animal.
,, VII .	10	83	1	19	8·30	,, ,,
,, VIII .	19	113	1	18	5·94	,, ,,
Monarch .	83	418	1	28	5·03	,, ,,
Donkey .	10	77	2	40	7·70	,, ,,

Showing the shortest, longest, and mean duration of plaques which appeared a second time in Dourine animals.

Yadgir .	3	10	2	4	3·33	*Vide* above.
Kilngarth .	6	103	4	25	17·16	,, ,,
Mare III .	12	114	2	19	9 00	Experimental animal.
,, IV .	1	8	8	8	8·00	,, ,,
,, VI .	2	9	3	6	4·50	,, ,,
,, VII .	1	9	9	9	9·00	,, ,,
,, VIII .	2	16	4	12	8·00	,, ,,
Monarch .	11	40	1	10	3 27	,, ,,

Showing the shortest, longest, and mean duration of plaques which appeared a third time in Dourine animals.

Mare III .	1	3	3	3	3·00	Experimental animal.
Kilngarth .	2	76	14	62	38 00	Spontaneous disease.
Monarch .	1	2	2	2	2 0	Experimental animal.

(VIII) *Day after covering or inoculation on which weakness in the loins or paraplegia was observed.*—From the following table it would appear that stallions are less prone to nervous complications than mares, and, when they are present, are exhibited at a later date.

In Australian mares the first symptom of weakness varied between the 156th and 173rd day following covering, but in the New Zealand mare the first symptom appeared on the 71st day.

In country-bred mares, up to a period of 8 or 9 months after covering, no symptoms of weakness across the loins or paralysis had supervened, although in each instance the animal had passed through the period of natural plaque eruption.

TABLE V

Showing the day after covering or inoculation on which weakness in the loins or paraplegia was observed.

Description of animal.	Breed.	Probable date of acquiring disease.	Disease contracted spontaneously or inoculation	Date on which weakness or paraplegia appeared.	Day following covering to February 1904.	Result.	REMARKS.
Shamsher .	Arab . .	……	C. S.	…	…	…	Absence of symptoms while under observation for 517 days.
Kilngarth .	T. B. English	Dec. 10th, 1902	"	…	.	…	Absence of weakness up to 447th day.
Yadgir . .	Arab . .	June 1902 .	"	…	…	…	Absence of weakness up to 564th day.
Vender .	T. B. Australian.	April 1901 .	" *	May 1902 .	380th	Death 12 Oct. 03	Animal apparently recovered second attack.
Monarch .	Arab . .	May 4th, 1903 .	"	1904 Feb. 25th .	298th	…	Symptoms slight, passed off.
Donkey III .	C. B. . .	Aug. 4th, 1903 .	Inoc.	.	…	…	Absence of weakness on 210th day.
Mare I .	Australian .	April 3rd, 1903	C. S.	1903 Sept. 22nd	173rd	Death	Death, September 24th, 175th day.
" II .	" .	May 7th, 1903 .	"	…	..	…	No symptoms up to 333rd day.
" III .	" .	April 17th, 1903	Inoc.	Sept. 19th	156th	Death	
" IV .	" .	April 17th, 1903	"	Sept. 28th	165th	…	Symptoms slight, passed off.
" V .	New Zealand	May 11th, 1903	C. S.	July 20th .	71st	Death	Death on 75th day.
" VI .	C. B. . .	June 11th, 1903	"	…	…	…	Absence of weakness up to 264th day.
" VII .	" . .	June 30th, 1903	"	…	..	…	Absence of weakness up to 245th.
" VIII .	" . .	July 5th, 1903 .	"	…	…	…	Absence of weakness up to 240th.

(IX) *Trypanosomata in vaginal mucus.*—As Dourine is transmitted from mares to stallions through infection during the act of coition, it is self-evident that the "contagium" must at times, if not always, be present in the genital passages of the affected mare. Observations were, therefore, conducted with a view to determine when and during what period of the disease the trypanosoma could be found in the vaginal mucus of the affected animal.

TABLE VI

Showing the day after the primary covering or after inoculation on which the trypanosoma was discovered in the vaginal mucus.

No. of Animals.	Breed.	Covered or inoculated.	Date of first covering or inoculation.	Date on which trypanosoma discovered in vaginal mucus.	Date after covering or inoculation discovered days.	Up to what date did it persist.	Result of case up to Feb. 29th, 1904.	REMARKS.
Mare I	Australian	Covered .	1903 April 3rd	1903 ...	...	...	Death .	Trypanosoma not found in vaginal mucus.
,, II	,,	,, .	May 7th	June 9th	34th	1904 Feby. 29th	Survived	Length of paroxysms vaginal mucus 1 to 4 days. Intermission 1 to 6 days.
,, III	,,	Inoculated	April 17th	May 4th	18th	1903 Nov. 8th	Death .	Paroxysms and intermissions at irregular intervals, no record kept of numbers.
,, IV	,,	,,	April 17th	1904 Jany. 30th	289th	1904 Feby. 27th	Survived.	
,, V	New Zealand	Covered .	May 11th	1903 July 20th	71st	1903 July 25th	Death .	14 trypanosomata in one cover-glass 4 days before death.
,, VI	C. B.	,, .	June 11th	Dec. 11th	179th	1904 Feby. 29th	Survived.	
,, VII	,,	,, .	June 30th	Augt. 18th	50th	Feby. 29th	,, .	Length, paroxysms 1 to 3, intermissions 1 to 3 days.
,, VIII	,,	,, .	July 5th	July 21st	17th	Feby. 29th	,,	Length, paroxysms 1 to 2 days, intermissions 1 to 4 days, 6,460 trypanosomata in one specimen.

Mare II.—Microscopical examinations of the vaginal mucus were conducted at intervals up to the 22nd July 1903, the 77th day, but between the 7th August and 15th September 1903, the 93rd to 132nd inclusive, a period of 39 days, a systematic examination of stained cover-glass specimens was made daily, in order to determine the number of trypanosomata present. During this period nine paroxysms and nine intermissions occurred. The former occupied 15 and the latter 25 days. The duration of the paroxysms varied from 1 to 4 and the intermissions from 1 to 6 days. The number of trypanosomata during the paroxysms were found to vary in the small quantity of mucus examined on each occasion from 1 to 2,000 in a cover-glass specimen.

Mare VII.—During the first seven weeks no protozoa were discovered in the vaginal mucus. (August 7th to September 15th.) But during the following 27 days eight paroxysms and eight intermissions occurred, the former occupying 12 and the latter 15 days, the duration of the different periods being 1 to 3 days respectively. The trypanosomata varied during the paroxysms from 2 to 278 in a cover-glass specimen.

Mare VIII.—Observations conducted daily between 7th July and 15th September 1903 inclusive demonstrated that during the first 14 days no trypanosomata were present in the vaginal mucus. But during the following 57 days ten paroxysms and ten intermissions took place, the former occupying 12 days and the latter 45 days. The protozoon was discovered at intervals in varying numbers of 1 to 6,480 in a cover-glass specimen up to the end of February 1904, when the observation ceased. The trypanosoma was not observed on microscopical examination in anything but the vaginal mucus; in the muco-purulent discharge it was searched for on several occasions, but never discovered. As soon, however, as an interval occurred in the secretion of the latter, the trypanosoma was usually found in the unmixed vaginal mucus. From the above table it may be observed that trypanosoma was found in the vaginal mucus, as early as the 17th or 15th day after covering; perhaps it may have been present even before that date. At times clear, glairy mucus dropped from the lower commissure of the vulva, and in this the trypanosoma was found; on the other hand, great difficulty at times was experienced in obtaining sufficient mucus to place on a cover-glass for microscopical examination.

During the act of micturition the lower part of the vaginal passage was washed free of mucus, so that, if an attempt were made immediately after the act, no mucus was forthcoming. It was observed that the eruption of plaques frequently made their appearance during the periods of intermission, or absence of the trypanosoma from the vaginal mucus, but exceptions to this were noted in mare IV, in which the trypanosoma was only discovered in the mucus on the 289th day after covering, and in that of mare I the protozoon was not found at all.

(X) *Exciting causes which frequently bring about a primary or a further eruption of plaques.*—The course of Dourine in some horses is particularly noticeable on account of the small number of plaques which make their appearance; consequently there is a long period of intermission between their respective eruptions. In others certain stallions exhibit latent symptoms only, such as swelling of the sheath for long periods, but no other signs of the disease. In these two classes of cases it has been found that, if the animals are subjected to certain depressing conditions, principally brought about by fatigue from whatever cause, such as covering, shaking during a long railway journey, prolonged march, or throwing and bleeding an animal to the amount of 20 c.c. from the jugular vein, a fresh eruption, or, as in the second instance, a primary eruption of plaques, may become manifest within a short period. The following examples may be given in illustration of the first class of cases.

Yadgir.—Plaque 31 appeared 25th October 1903. On the 15th December 1903, 51 days had supervened without the eruption of a plaque. Bled 20 c.c. on latter date. Plaque No. 32 appeared 60 hours after bleeding operation.

Shamsher.—Plaque No. 17 appeared on 29th September 1903. December 16th, 1903, 78 days supervened without the eruption of a plaque. Bled 21 c.c. on latter date. Plaque No. 18 appeared 36 to 40 hours after the bleeding operation.

The following instance may be given in support of the latter class of cases:—

Yadgir.—Swelling of sheath and scrotum reported in August 1902; no other symptom noted until animal despatched by train to Bareilly on the 29th and arrived on the 31st March 1903. First plaque appeared during the night of the 2nd and 3rd of April,-on the 232nd day after the appearance of the primary symptom and within 72 hours of being detrained.

It would appear that, owing to the reduction in energy brought about by one of the abovementioned causes, a loss of power of resistance was produced in the respective animals, which allowed of the trypanosomata developing and thriving in blood which previously had been an unsuitable medium, and had held them in check.

Section IV.—SYMPTOMS.

The course of this disease may on the one hand be comparatively rapid or on the other slow; the symptoms may vary in different animals and breeds of animals so that an important symptom may occasionally be absent; nevertheless in a great majority of cases one is able to recognize in the development of symptoms several periods. It must be observed that in dividing the course of this disease into periods the appearance of the most important symptoms does not always follow in definite sequence, and that one series of symptoms may not have run its course and subsided before the succeeding series make their appearance. What really is observed in practice is an overlapping or a partially concurrent exhibition of certain symptoms referable to the respective periods. However, in one case the second train of symptoms had developed before the appearance of the first was observed. For this reason the following arrangement is purely an arbitrary one, simply utilized for the sake of description.

The characteristic phenomena exhibited in the course of Dourine are referable to the genital organs, the skin, and to the nervous system, and may be divided into three periods :—

(i) Characterized by changes to the genital organs and structures in close apposition.

(ii) Cutaneous lesions of vaso-neurotic origin.

(iii) Lesions of the central nervous system.

I. The symptoms during the first phase differ in the stallion and the mare, and therefore will be described separately.

Stallions.—The primary changes usually commence within 10 to 29 days after covering an infected mare. These may be so little marked that, unless careful and daily examinations are conducted, the symptoms may escape notice. These consist of infiltration of the penis, particularly observable towards the free end of the organ, during erection. The urethral mucous-membrane is inflamed and sooner or later protrudes slightly from the "meatus-urinarius" and assumes a semi-globular form, the colour at first being red or rose-pink. The m. m. covering the surface of the penis in some cases may be marked red and white and present erosions or ulcers on its surface, discrete or more or less confluent, but this condition is neither constant nor necessary, and may be looked upon in many instances as the result of secondary infection. When the organ is in a state of complete erection, the glans-penis acquires a volume so great that its return is accomplished with considerable difficulty, if at all. Consequently, paraphymosis may follow and the same has been observed to become more or less persistent in some cases and exist up to and at the time of death several months later. The manifestations of the symptoms in the male are most uncertain, lying dormant for long periods and only lighting up after the animal has been subjected to and influenced by some depressing conditions, for the most part by fatigue brought about from whatever cause. The sheath then becomes the seat of an œdematous swelling, which may be the only one present during a series of months, or this symptom may be the very first to be recognized. Later, the swelling extends to the umbilicus and frequently behind to the scrotum, and in advanced cases swelling and œdema of the under-surface of the abdomen may occasionally extend forward to the sternum and present inordinate proportions especially in imported breeds of horses as English and Australian. In the majority of cases the testicles remain healthy, while in others the testicles and spermatic cords are swollen and extremely tender on manipulation. There may be a frequent desire to micturate, which is only accomplished after considerable discomfort and straining, and sexual excitement is most marked at frequent intervals. At this time also the inguinal glands and lymphatic vessels may become involved and noticeable on palpation. During the first period in the stallion, it is difficult to imagine that the animal is the subject of a serious form of disease, as the general symptoms may be entirely absent, the temperature within normal limits varying but half a degree Centigrade between the morning and evening records, the appetite unimpaired, and no noticeable loss of flesh.

Mares.– The first symptom after the infective covering most frequently observable is inflammation of the mucous-membrane of the vagina (vaginitis) followed by the formation of a vesicle or vesicles and later ulcers. These readily heal, and if situated a little distance from the vulva may be overlooked. To the casual observer the first symptom to draw attention is the swollen condition of the lips of the vulva; the swelling may in the first instance be unilateral, bilateral or affect the lower half of the vulva and inferior commissure, but frequently at a later date both sides of the vulva become involved, and undergo an alternate augmentation and diminution in size which immediately arrests the attention of the observer. The swellings may increase and extend upwards to the tissues of the anus forming folds on either side of the vulva, and downwards to the perineum and mammary region, occasionally invading the subcutaneous tissues of one or both thighs. These swellings are for the most part cold and painless. A clear mucus discharge, which may become abundant and later of a yellowish colour, escapes from the vaginal passage and becomes dried on the inferior commissure of the vulva, but the quantity and quality of this discharge varies considerably in different mares and may in some cases be hardly noticeable. About this period the mucous-membrane of the vagina becomes more or less œdematous, and owing to the patency of the vulva brought about by the pressure from within may be a marked symptom. Sexual excitement is frequently present, and in addition, an intense irritation due to pruritus causes the patient to take advantage of any object that may be in close proximity to rub herself against. During the first period in mares unpigmented patches or leucoderma may appear and involve the vulva after the separation of the film-like epidemic scales.

II. This phase of the malady is more or less distinguished as that during which the 'contagium' becomes generalized through the system, and some symptoms become aggravated, while the cutaneous lesions of vaso-neurotic origin are developed. In addition, slight or more pronounced complications with regard to nutrition, momentary or more persistent paralysis, an abnormal sensibility of the lumbar region, kidney-complications, spasmodic affection or loss of control over the movements of the hind limbs while walking, and sudden flexion of the fetlock joints may become apparent.

The cutaneous manifestations may be divided into three varieties of eruptions :—

(i) The plaques or patches, the most generally marked symptom of Dourine (blood of which contains the trypanosoma), but which are not absolutely pathognomonic of the disease, as an animal may pass through an attack and eventually succumb to paralysis and the trypanosoma be demonstrated in other fluids, without the animal exhibiting any cutaneous symptom.

(ii) Disseminated urticaria more or less of a fugitive character.

(iii) Eruption of small vesicles

(1) *Plaques.*—These are elevations which may appear suddenly or slowly; earlier as a rule in mares than in stallions, when the disease is contracted spontaneously. Developing on any part of the body including the upper portions of the extremities, these plaques are neither hot nor tender on manipulation. They appear singly or in crops at successive intervals, so that during their eruption the course of the disease is marked and in some cases sharply defined by the presence of paroxysms and intermissions as in the case of Surra. The number of plaques which may appear vary considerably during each paroxysm, and the length of both paroxysms and intermissions are also subject to great variation in the same and different animals. The plaques vary from half an inch to eight inches in length. In this country according to our observations they appeared in the majority of instances in mares and in a few stallions from the 24th to the 34th day after the first covering or inoculation, while in the majority of stallions they appeared at a much later date.

The different forms assumed by the plaques are—

(i) The classical plaque observed in Europe and North Africa is as if a thin disc of metal had been introduced under the skin of the affected area. This is a somewhat rare form of plaque in India.

(ii) Œdematous patches, circular, oval or irregular in outline, meniscus form.

(iii) Œdematous patch, oval or circular in shape, pitted in the centre, which may later fill up and assume the œdematous form as No. (ii).

(iv) Large, circular or oval in form, with a flat area in the centre, which does not appear to be involved in the pathological change.

The hair covering such patches may be raised, while in others there may be only slight unevenness noticeable. Plaques vary considerably as to the periods of their persistency, some disappearing after twenty-four hours or less, while others may undergo variations in dimensions and remain well marked for 60 days or longer, especially those plaques which invade the region of the neck of the affected animal. The plaques appear but once as a general rule, but in a certain number of cases reappear on the same spot and frequently present a similar outline to that exhibited on the first occasion. After disappearing a second time a small percentage may again, after a short interval, make themselves manifest for a third time, whilst at a much later date an entirely fresh plaque may appear invading the same or a much larger cutaneous area.

2. *Disseminated urticaria.*—This is the small circular or oval form of eruption well raised, and either discrete or confluent, affecting the skin of the body generally or only one particular region at a time. It is fugitive in character and indistinguishable from the urticarial eruption observed in equines the subjects of Surra.

3. *A vesicular* but discrete eruption dotted over the surface of the body, which persists for several days and which liberates a glairy material, something like white of egg. The hairs in close proximity become soiled and matted together. At a later date frequently, a small bare patch marks the affected area previously involved.

The period of the disease during which the eruption of plaques takes place has been found to differ in this country according to the breed of horses affected, but as a general statement one may say that in the indigenous breed of equines or country-breds the period is the shortest, and increases in length according to the ratio of the distance from India from which the imported animals have been introduced. Concurrently with the above-mentioned manifestations other symptoms make their appearance and become more or less accentuated. With regard to the glandular system, those in close vicinity to the affected regions have up to this time been the principal ones involved, but now the lymphatic glands throughout the body may become implicated, including the submaxillary. As a result, suppuration may supervene especially in those in the neighbourhood of the scrotum in the stallion and udder in the mare and continue in severe cases until death. The affected animal suffers from malaise and spends a good deal of its time in the semi-recumbent position, but with appetite unimpaired; nevertheless it gradually falls off in condition, and presents an unhealthy and unconditioned appearance together with a dry and staring coat. When standing, the animal alternately throws the weight of its body from one hind limb to the other, and specially when first removed from the stall may stumble; at the walk the point of the hoof will be seen to tip the ground and later the animal may drag the posterior extremities. Frequently these symptoms are intermittent and entirely disappear for days together, recurring just as suddenly, and for the most part *only affecting mares,* according to our observations in India. The sensibility in the lumbar region as noted by all observers is so marked in the majority of cases that slight but sustained pressure will make the animal crouch, if not fall, to the ground. This sensibility is more especially present over the kidney-region, and albumen may now be observed in varying quantities in the urine. During this period of the disease articular swellings make their appearance in some animals. They are somewhat fugitive in character, now affecting one hock or fetlock joint, but within 24 to 48 hours another limb may be the seat of the swelling, while some pain on pressure is frequently evinced, due no doubt to the inflammatory condition of the engorged synovial membranes. As a complication, lymphangitis of a limb may appear and persist, thus helping to rapidly reduce the strength of the animal and bring about death prematurely. The temperature during this phase of the disease, unless in the presence of severe complications, continues to run an even course, scarcely varying between a minimum of 37° and a maximum of 38° C.

III. *Phase.*—In acute cases of disease in the stallion and mare the general symptoms gradually become aggravated; there is progressive emaciation together with marked weakness and anæmia. The animal, whose hind limbs scarcely appear to belong to its body, has difficulty in maintaining the upright position. Paraplegia at this stage may appear suddenly, without any previous indication, and the animal thus stricken is unable to rise, and although able to take food in the recumbent position, dies within a few days from exhaustion, or from lung complications. On the other hand, although greatly emaciated animals presenting symptoms of muscular paresis or paraplegia have been observed to fall and be unable to regain the upright position without assistance, nevertheless all such cases are not hopeless, for some may gradually improve and lose all signs of weakness in the loins and limbs and again proceed to put on flesh.

As the disease advances, it will be found that, as in the course of Surra in equines, so in Dourine the quantity of urea is greatly increased to twice or thrice the normal output. Towards the termination of an acute case hæmaturia or hæmoglobinuria may supervene. In the former case the urine is thick, reduced in quantity, presenting the appearance of porter, the amount of salts is increased, and a small percentage of albumen is present. In addition, at this stage the urine is laden with granular casts, giving an indication of the severe changes which have implicated the kidney structures. Until a few days before death, the body temperature may have never exceeded normal limits and even at death the temperature may register but 38·5° C. On the other hand, fever may gradually supervene within the last few days of life and a maximum temperature of 40·5° be present when death takes place.

Dourine in the ass.—The symptoms of spontaneous Dourine in the ass are few and discrete and in the ordinary course of events would be overlooked, unless, as occasionally happens, there is an eruption of plaques. The stallion, according to our observations, presents the most symptoms. The only symptom that can be relied upon according to Schneider and Buffard is an œdematous condition of the extremity of the penis, which causes obliteration of the folds of mucous-membrane round the orifice of the urethra. The mucous-membrane of the meatus-urinarius is everted. Œdema of the prepuce becomes developed later. The cutaneous plaques are very rare in both sexes. In those cases in which the male is susceptible to the disease, and this is rare, the eruption of symptoms is similar to that which occurs in the horse. Emaciation is very marked, as also engorgement of the sheath and scrotum, and paralysis follows in due course.

The symptoms which follow the inoculated disease, in the small country-bred donkey, are most marked at the seat of the subcutaneous injection where a primary and later a secondary diffused swelling forms, a period of some eight days occurring between the successive events. In one case the eruption of subcutaneous plaques commenced on the 33rd day after inoculation and the 10th and last on the 50th day. The m. m. of the meatus-urinarius became everted, but no further symptoms developed up to the 217th day.

Section V.—DIAGNOSIS.

In order to come to an absolute diagnosis, it will be necessary to follow up two lines of observation : —

(*i*) A clinical examination, (*ii*) microscopical examination of certain body fluids for the presence of the parasite. The eruption of symptoms in a case of Dourine usually appear in the following sequence:—Œdema of the genital organs, enlargement of the lymphatic and other glands, eruption of plaques or urticaria, progressive emaciation, tenderness over the loins, nervous complications, but may in some cases follow an erratic course. Should any of the above symptoms be observed in equines, suspicion should at once be aroused as to the presence of Dourine, Surra or some other contagious disease.

(*i*) *Clinical.*—If the early manifestations in the stallion or mare have been observed, and attention drawn to the probable nature of the disease, the case, although requiring time before an absolute diagnosis can be arrived at, will be easy. If, however, in the stallion the external local changes are only slightly marked and in mares the period of their appearance has been passed, the disease can then only be recognized by these animals respectively infecting others, and by this means also further symptoms, *viz.*, the eruption of plaques, may be brought about at an earlier date. The appearance of the cutaneous plaque or patch is the chief and most important symptom to be looked for in the diagnosis of Dourine, but it must here be remembered that in exceptional cases the number of plaques may not exceed four in a period of 200 days with periods of intermissions extending from 1 to 134 days between the eruption of each, and on the other hand, there may be no eruption at all and yet the mare may be in a position to infect any stallion that may serve her. Not unfrequently it happens that certain stallions may exhibit for long periods a latent symptom which points to the presence of Dourine, *viz.*, swelling of the sheath, but an absolute diagnosis cannot be arrived at until such time as further symptoms may be developed. In such cases certain depressing influences, fatigue, loss of blood, etc., have been found to bring about the eruption of cutaneous plaques, so that when it is important to come to a diagnosis quickly, the simple measure of bleeding might be had recourse to and much time and expense would be saved. A difficult but particularly pertinent question may arise before a diagnosis can be arrived at, *viz.*, how to diagnose Dourine in mares when the disease is known to be present amongst certain animals, but all clinical symptoms are absent? Microscopical examination of the vaginal mucus may materially aid the diagnosis, for the mature protozoon or its developmental forms have been found as early as the 17th day after the infective covering, and have been observed to reappear at short intervals during a period of over 9 months.

(*ii*) *The microscopical examination of body fluids for the presence of the parasite.*—The trypanosoma is always present for a period in the blood or sero-sanguinuous fluid of a plaque, and in those cutaneous lesions which persist for some time, the protozoon goes on increasing until large numbers are developed (see page 34). On the first appearance of œdematous collections the protozoon can generally be found, but later numerous stained specimens may have to be made before the developmental forms may be discovered; but if sufficient time and care be expended, a positive result will be obtained. In this country the inoculation of susceptible animals with blood or œdematous fluid of suspected cases will give results, but pariah dogs react in too uncertain a fashion to be utilized, and country rats may be included in the same category. Donkeys may react to inoculation with infective blood and later exhibit plaques, but in most instances stallions or jacks present a secondary swelling at the seat of inoculation after a period of 12 to 15 days and in the fluid drawn from this swelling the mature trypanosoma or the developmental forms may be observed and a diagnosis made, although no subsequent exhibition of symptoms may follow with the exception of the eversion of the m. m. of the meatus urinarius. An immediate diagnosis between Surra and Dourine may not be an easy one, especially in some advanced cases, unless microscopical examination of the blood from the general circulation be made daily until the presence of the trypanosoma has been demonstrated in the case of the former disease. The extensive œdema which collects on the under-surface of the abdomen in some Surra animals may be simulated in cases of Dourine and occasionally almost surpassed. In Surra animals the paroxysms or pyrexial periods are usually accentuated by the presence of well-marked conjunctival petechiæ, high fever and the presence in vast numbers of the hæmatozoon, whereas in Dourine the temperature rarely exceeds normal limits or at all events for long periods at a time, and there is a complete absence of conjunctival petechiæ. The protozoon may only be present in small numbers or undiscoverable on microscopical examination of blood from the general circulation. Surra is an acute disease absolutely fatal to equines within a few months (2 to 3) of its onset. Dourine is essentially chronic in character; death rarely occurs before six months have elapsed. Vesicular Exanthema has until late years been considered to be a benign form of Dourine. This was accounted for by the fact that the two diseases are liable to be contracted from the same animal during a single act of covering. In the former disease the period of incubation may be but a few hours (12 to 18), or more prolonged and pass off within a period of three weeks, leaving white patches (leucoderma) on the tissues of the external genital organs. It is almost impossible to diagnose the presence of Dourine during the persistence of the acute symptoms, although a shrewd suspicion may be entertained. Our experience points to the fact that the trypanosoma does not develop in the muco-purulent discharge; but when this has ceased, it may in some cases be found within a few hours, in the vaginal mucus, unmixed with blood. Should leucoderma of the external genitals, especially in mares, present itself during the first three weeks of the development of symptoms, this will probably point to the fact that the tissue changes have been caused by Vesicular Exanthema, but in nowise can this disprove the presence of Dourine also, as the primary symptoms of the former disease may only have masked the symptoms of Dourine, if any were exhibited, and the latter disease may appear later in due course. In the following table will be found the essential points of similarity and the reverse in the cases of Surra and Dourine:—

TABLE VII.

The differential diagnosis of Surra and Dourine in equines in India.

Symptoms.	Surra.	Dourine.
Period of incubation.		
Spontaneous . .	When conveyed by flies 4 to 8 days.	Stallions 16th to 29th day. Mares from 10th to 49th day.
Inoculated . .	Paroxysmal blood from general circulation 4 to 6 days. Intermission blood from general circulation, 8 to 10 days.	General circulation blood—13 to 18 days. Plaque blood—12th or 8th day.
Paroxysms and Intermissions.	Course of disease sharply defined into paroxysms and intermissions by presence and absence of mature trypanosoma in the blood.	Paroxysms and intermissions, sometimes sharply defined.

TABLE VII—*contd.*

The differential diagnosis of Surra and Dourine in equines in India—contd.

Symptoms.	Surra.	Dourine.
Paroxysms and intermissions.	Paroxysms longer at commencement of attack.	Paroxysms longer at commencement of attack.
Ditto . .	Paroxysms shorter at end of attack.	Paroxysms shorter at end of attack.
Ditto . .	Intermissions *vice versâ* .	Intermission *vice versâ.*
Temperature . .	Pyrexia during paroxysms may run up to 43° C.	Chief feature slight variation, generally within normal limits, except shortly before death.
	Apyrexia during intermissions normal or subnormal.	
Symptoms, eye .	Conjunctival petechiæ marked feature.	Entire absence of conjunctival petechiæ.
Ditto cutaneous.	Disseminated urticaria (fugitive) occasionally during course of disease.	Plaques of various kinds and sizes. Disseminated urticaria. Frequent eruptions, small vesicles discharging glairy clear fluid.
Ditto subcutaneous	Gelatinous exudation light yellow or greenish in colour, lying in subcutaneous tissue, sometimes in enormous quantities, under-surface of abdomen, sheath, lower extremities, also intermuscular and running in the sheaths of the nerves.	Gelatinous exudation, involving cutaneous plaques, penetrating muscles, vessels and nerves and under-surface of abdomen as in Surra cases.
Ditto nervous .	Weakness across the loins, a common symptom as the disease advances in both sexes.	Weakness across the loins most marked in mares followed by paresis or paraplegia in different degrees of intensity.
Ditto articular .	A complication of the advanced disease.	A frequent complication in second and third phases of the disease.

TABLE VII—*contd.*

The differential diagnosis of Surra and Dourine in equines in India—contd.

Symptoms.	Surra.	Dourine.
Symptoms, muscular	General emaciation, colour dark red or lighter shade, fatty degeneration.	Emaciation of the muscles of croup and hips, but general atrophy in advanced cases. Fatty degeneration.
Œdema of belly	Inordinate amount in advanced cases.	Small percentage of imported horses as in Surra.
Lymphatic glands	Somewhat enlarged, not a marked feature.	Increased in size, infiltrated, sometimes softened, especially abdominal and inguinal.
Lymphangitis	Appears as a complication.	Twice observed in 14 cases. Hind limbs.
Lungs	Emphysema, ecchymoses usually present.	Emphysema, ecchymoses uncommon.
Spleen	Always enlarged to a greater or less degree, abnormal proportion sometimes when animal dies during long paroxysm, smaller if death during long intermission.	Variable, enlargement very marked in some cases, no perceptible enlargement in others.
Liver	Nearly always enlarged up to 17 or 19 lbs.	Generally enlarged.
Heart	Base surrounded with gelatinous exudation externally petechiated or small extravasations of blood subendocardial extravasations frequently present.	Base presents gelatinous exudation at times, subendocardial extravasations rare.
Genito-urinary organs, testes, etc.	Sheath much swollen in advanced case, urethral m. m. may be everted Orchitis a rare symptom. Atrophy of testes observed.	Enlargement of sheath may be first symptom noticed, great enlargement especially in Arab horses, mucous-membrane of urethra everted. Orchitis not a frequent symptom, atrophy frequently in advanced cases.

TABLE VII—*concld.*

The differential diagnosis of Surra and Dourine in equines in India—concld.

Symptoms.	Surra.	Dourine.
Vulva and vagina .	Vulva and vagina rarely implicated.	Unilateral or bilateral enlargement of vulva. Œdema spreading to adjacent parts. Vagina inflamed may be petechiated.
Sexual excitement .	Marked (in both sexes) .	Well marked symptom.
Mortality (equines) .	Absolutely fatal in equines	70 per cent. of cases fatal in Europe and North Africa. Fatality less in the East, especially amongst country-breds.
Ass . . .	Fatal (disease more prolonged than in horses).	Susceptibility varies. With or without symptoms, rarely fatal.
Bovines . . .	Susceptible, rarely fatal, blood capable of reproducing disease for long periods.	Appear to be insusceptible, no reaction to inoculation of infective blood.
Goats (plains) . .	Not fatal . . .	?
„ (hill) . .	Majority succumb to inoculated disease.	?
Dog (pariah) . .	Fatal to spontaneous and inoculated disease.	Great majority insusceptible.
Cat . . .	Fatal to inoculated disease	Insusceptible (Blaise).
Rabbit . . .	Fatal „ „	More or less susceptible in India.
Rat (m. d.) . .	Fatal „ „	Susceptible in minor degree (not fatal).
Mouse . . .	Fatal „ „	Susceptible in minor degree (not fatal).
Ox and camel . .	Are capable of carrying the trypanosoma and the developmental forms of the protozoon in their blood for long periods. The blood of general circulation in the former animal has been found infective to susceptible animals for over a year, while in the latter it has been found infective after three years' persistence of the disease.	The blood of the affected stallion may reproduce the disease three years after exhibition of the primary symptoms and the blood of a donkey has been proved infective two years after contracting Dourine.

Section VI.—COURSE AND PROGNOSIS.

Observations conducted in different countries vary as to the duration of this disease. Thus, in France, it is said to extend from three to eight months and even to three years; while in Germany it is stated that its average duration is from six months to a year, although it may extend to four years or even longer. In the few cases which have come under our observation in India, it would appear that in stallions the disease may run on for longer periods than in mares. We have in two horses evidence that disease may still be in an active state after an interval of three years has elapsed from the exhibition of the first symptom, while in mares we find that the disease ran its course and death occurred after 75 days in the case of a New Zealand animal and in two Australians; the interval between covering or inoculation and death was just under 6 and 7 months respectively. Our observations have been conducted with several breeds of equines, and the evidence at our disposal points to the fact that country-bred mares are not so susceptible to Dourine as imported animals, and this we can understand if we look upon the malady as one that has had its habitat most probably for an indefinite period in the East, so that the "contagium" has less effect upon country-breds than it has upon imported breeds as English and Australians, which come from countries where the disease has never been observed. Most European authorities give the mortality in this disease as 70 per cent., and state that recovery is only possible at the beginning of the attack, the prognosis being more unfavourable in stallions than in mares.

Sufficient time has not been allowed to elapse with regard to experiments, to allow of our giving anything but a guarded opinion, for our oldest case only dates back to the early part of 1901, *viz.*, *Shamsher*, and the animal presents certain symptoms of active disease at present (March 1904). Of 13 horses and mares under observation, four have succumbed, *viz.*, one stallion, *Vendor*, and three mares (one a New Zealand breed and the other two Australians), so that the mortality up to date, March 1904, has been 30·77 per cent. Stallions appear to offer more resistance to the 'contagium' than mares.

Mares of most breeds are more liable to acute Dourine than stallions.

The mortality is greater in mares than in horses.

The progress of Dourine is more rapid in mares than in stallions, and the disease runs a more rapid course in imported than in country-breds.

Some country-bred tatoo mares appear to resist repeated inoculation of infective Dourine blood, exhibiting an exactly similar resistance to the 'contagium' that the majority of donkey mares do.

Section VII.—MEANS BY WHICH THE DISEASE MAY BE PROPAGATED.

Dourine is transmitted during the act of coition from stallions to mares and from mares to stallions. It stands to reason, therefore, that the disease is disseminated chiefly by stallions, although the horse must, as a general rule, contract the disease from a mare in the first instance. It is stated that an infected stallion may be the means of conveying the disease to the great majority of mares covered by it during a season. It must, however, be clearly recognized that there is a possibility that the disease may be conveyed from animal to animal by the use of soiled stable gear. In the course of the experiments, the results of which are now put on record, the disease has been contracted spontaneously by six mares covered by three infected stallions, a positive result having been obtained in each instance. Further, two mares contracted the disease when inoculated on the vulva with a trace of blood drawn from a cutaneous plaque. In this country, "the land of flies," the spontaneous mode of propagation of the disease from equine to equine does not exhaust the resources of Nature. The trypanosoma, the "materies morbi" of Dourine, is present in the mature and developmental forms not only in the blood and fluids of the numerous large plaques which appear on the cutaneous surface of the body in the affected stallion and mare alike, but also in the blood of the general circulation during long periods at a stretch. It has been found possible to convey to certain species of flies (*Tabanus Tropicus, Hippoboscidæ and Culicidæ*) allowed to suck blood from an affected animal, the 'materies morbi' of the disease, and for such flies to convey the disease to susceptible animals in close proximity by direct infection is but an easy matter, as proved by me in the case of Surra as early as 1891. During protracted periods, the mucus collected from the vagina has been demonstrated at intervals to contain immense numbers of mature and developmental forms of the trypanosoma; further, mucous dropping to the ground from the lower commissure of the vulva has been found, on miscroscopical examination, to contain as many as 5 to 6,000 trypanosomata in one thin cover-glass preparation. Flies are continually settling on the vulva of the affected mares, and collect also on the mucus which escapes from the passage and falls to the ground. Consequently, without the affected animals are protected from flies and the stable floors kept clean and disinfected, it is possible for flies to carry the 'contagium' and communicate the disease by direct infection to healthy equines, at all events those situated in their immediate vicinity.

Section VIII.—SUSCEPTIBILITY OF DIFFERENT ANIMALS.

Horses are the most susceptible animals to Dourine. The power of resistance to the disease is more marked in stallions than in mares. The malady runs its course in a shorter period in imported animals than in the indigenous, and certain country-tatoos appear to be insusceptible to the subcutaneous inoculation of considerable amounts of infective blood.

Susceptibility in the donkey of this country (C. B.) varies, but in no instance is it in any way comparable to that of the horse, although occasionally the eruption of plaques may be a marked symptom.

The pariah dog is in the great majority of instances insusceptible, even inoculation into the anterior chamber of the eye producing no effect, young puppies exhibiting the same degree of resistance to the disease that adult dogs show.

The rabbit also shows a certain degree of resistance to the inoculated disease, as is also the case in the rat. (*Mus Decoumanus.*)

Section IX.—PATHOLOGICAL ANATOMY.

The course of Dourine is essentially chronic in character except in a very small percentage of cases, consequently in those animals which succumb to the disease the body is usually emaciated, for, as in the case of Surra in equines, this malady is characterized by a progressive emaciation or loss of flesh, particularly noticeable in the region of the croup, hips, and loins. Should the animal succumb during the eruption of cutaneous plaques, certain circumscribed elevations may be noticeable on the surface of the body. *In stallions,* the penis will be seen to be partially protruded from the sheath and infiltrated more or less towards its free extremity, the external surface of the mucous-membrane may exhibit small round cicatrices white in colour, the sequelæ of former ulcers.

The urethral mucous-membrane is usually protruded and somewhat thickened. The proportions of the sheath vary much in different cases, from little or no increase to large dimensions. *On section* of such a sheath, the structures will be seen to be indurated and considerably thickened and at the same time to be distended with gelatinous material through which fibres of connective tissue cross and recross, thus binding the structures together. *In the mare,* the anus will be seen to be retracted, lying at the anterior extremity of a cavern-like depression, the lips of the vulva patent in the lower commissure, either somewhat œdematous or atrophied in emaciated animals, and sometimes the seat of leucodermic patches.

On removal of the skin, a thin film of gelatinous material, together with discolouration of the tissues at the seat where the plaques were situated, will probably be all the signs noted, except in such animals as have exhibited more or less œdema on the most dependent parts of the body, *viz.*, chest, abdomen and lower extremities. In some cases, this material may assume inordinate proportions in such situations. In small quantities this gelatinous exudation may be found between the muscles and running along the sheaths of the large nerve trunks. On opening up the body, it may be observed that the muscles are atrophied more especially in those regions above noted, and on microscopical examination it will be found that the fasciculi of certain sets of muscles have undergone fatty degeneration to a more or less extent. The superficial lying lymph-glands may be enlarged and infiltrated, *on section* fluid of a yellow colour may be seen to escape. The pleural cavities according to the symptoms and complications present may be free or contain blood-stained fluid in considerable quantities. The lungs, with the exception of presenting a certain amount of emphysema at the apices, in uncomplicated cases only present a few sub-pleural ecchymoses. The pericardial sac usually contains a certain quantity of fluid which varies in character and amount in different cases. The heart is frequently hypertrophied, the base the seat of a yellow-coloured deposit, gelatinous in character, which takes the place of the usual fat. The base of the organ is sometimes dotted over with small ecchymoses dark, red or purple in colour, which, as in Surra, lie under the visceral pericardium singly or in groups. The wall of the left ventricle is hypertrophied, and in a minority of cases subendocardial extravasations are present in the left ventricle. The liver is frequently enlarged, 14 to 18 lbs. in weight, and, *on section,* found to be somewhat engorged with blood. The spleen is always enlarged to a greater or less degree, 2·5 to 6 lbs. in weight and the capsule dotted over with red-brick-coloured ecchymoses. The tissues are, as a rule, firm and, *on section,* are found to be dark in colour. The kidneys are generally much increased in size, pale and petechiated, and the hilum filled with gelatinous exudation. The *testicles* may be hypertrophied or atrophied, and in some cases appear not to be affected at all, but it is not infrequent to find that the *tunica vaginalis* and *propria* are adherent. The tissues of the spermatic cord and epididymis may also be infiltrated and thickened. In the mare, the m. m. of the vagina may be either normal in appearance or of an orange colour, the capillaries injected and arborescent in their distribution, or the lining membranes of the vagina and uterus may be thickened and the former present dark red coloured nodules on its surface, resembling the common variety of sea-anemone. The changes observable in the nervous system vary considerably according to the period of the disease which has been reached at the time of death, and the length of persistence of the respective lesions. The most important changes are observed in the spinal cord, more especially in the lumbar and sacral portions. The cerebro-spinal membranes may be thickened in a minority of cases, but the fluid which they contain is nearly always increased and may present a normal, opalescent, or reddish colour according to the degree of changes present. It collects more especially at the brachial and lumbar enlargements. The cord in advanced cases of disease is attenuated in different situations, and on transverse section it presents an asymmetrical appearance, the tissues may be softened and permeated with red spots or almost fluid in localized areas. The grey matter is atrophied. The posterior columns of the cord appear to be the ones which are principally involved in the course of Dourine, and according to Marck, the change observed in the nerves is a poly-neuritis.

TABLE VIII

Showing the pathological conditions found in animals which succumbed to Dourine.

Organs.	Vendor.	Mare I.	Mare III.	Mare V.
General condition of nutrition of body.	Atrophy of muscles of croup and hips.	Atrophy of muscles of croup and hips.	Excessive emaciation .	Emication not excessive, most marked croup and hips.
Seat of plaques	Gelatinous material lying in subcutaneous tissue.	Thin film of gelatinous material at seat of existing patches.	No change observable .	No plaques.
Pleural cavities	1,500 c. c. blood-stained fluid.	No fluid or adhesions .	100 c. c. clear amber-coloured fluid.	Free from fluid.
Lungs . .	Emphysema apices general congestion.	Œdoma of both organs.	Distended with air, free from petechiæ.	Slight emphysemal apices sub-pleural petechiæ.
Pericardial sac	800 c.c. blood-stained fluid.	Few c. c. orange-coloured fluid.	180 c. c. amb-coloured fluid.	50 c. c. dirty yellow-coloured fluid.
Heart . .	10 lbs. 8 oz. L. vent. wall hypertrophied.	9 lbs. 2 oz. external surface petechiated, muscle fatty.	6 lbs. 8 oz. normal in appearance.	Subendocardial extravasations in L. ventricle.
Peritoneal cavity . .	Free from fluid . .	Free from fluid . .	100 c. c. clear amb fluid.	Free from fluid.
Liver . .	17 lbs. enlarged tissues soft.	18 lbs. 10 oz. tissues firm healthy.	14 lbs. 14 oz. tissues firm healthy.	Enlarged.
Spleen . .	6 lbs. 3 times normal weight, tissues black, pulpy.	3 lbs. 12 ozs. twice normal weight, external surface petechiated.	2 lbs. 6 ozs. firm dark red.	Normal in size, tissues firm.

TABLE VIII—*contd.*

Showing the pathological conditions found in animals which succumbed to Dourine—contd.

Organs.	Vendor.	Mare I.	Mare III.	Mare V.
Kidneys . .	R. 3 lbs. 7 ozs. enlarged L. 3 lbs. Semi-gelatinous material in hilum of each organ.	{ R. 1 lb. 12 ozs. { L. 1 lb. 11½ ozs.	{ R. 2 lbs. 15½ oz. { L. 2 lbs. 15 oz.	Normal in size, yellow gelatinous material in hilum of each organ.
Stomach . .	Normal in appearance .	Normal in appearance .	Normal in appearance .	
Intestines .	m. m. congested, capillary vessels injected.	„ „	„ „	Deposition of yellow gelatinous material on external surface and along intestinal bands.
Bladder . .	m. m. congested . .	„ „	„ „	Healthy in appearance.
Urine . .	Contains colouring matter of blood, no red blood corpuscles.	„ „	„ „	Healthy.
Genital organs.	Semi-solid œdema of tissues of sheath and scrotum. Adhesions between tunica vaginalis and memb. propria. Testes atrophied. Spermatic-cords thickened and infiltrated.	Labia swollen and œdematous. Subcutaneous tissues infiltrated with yellow coloured gelatinous material m. m. of vagina infected. Orange coloured œdematous tumours projecting into the lumen of the passage.	Vagina and uterus fairly normal in appearance.	Semi-solid gelatinous infiltration under skin of perineum, anus and vulva.
Spinal membranes.	Contained small quantity of slightly opalescent fluid.	Contained clear pale fluid.	Contained small quantity of clear fluid.	Contained small quantity of clear fluid.
Spinal Cord .	Capillary vessels injected, *external surface* pale in colour, no petechiæ or extravasations, *on section* grey matter may be slightly atrophied, no petechiæ or centres of softening.	Capillary vessels slightly injected, external surface of cord pale in colour, no centres of softening observable.	Capillary vessels injected with dark blood spinal cord attenuated, transverse section a symmetrical grey matter atrophied.	Capillary vessels injected. "*On section* of cord no centres of softening visible or a symmetry of the two halves.
Conjunctival m.m.	Free from petechiæ, capillary vessels free from injection.	Free from petechiæ, capillary vessels free from injection.	Free from petechiæ, capillary vessels free from injection.	Free from petechiæ vessels free from injection.
Schneiderian m.m.	Free from petechiæ .	Free from petechiæ .	Free from petechiæ .	Free from petechiæ.

Section X.—TREATMENT.

Numerous methods of treatment have been recorded, but up to the present nothing satisfactory has been demonstrated that will bring an affected animal back to a state of health. Castration of affected stallions, during the first phase when the changes are confined to the genital organs, is said to always aggravate the disease and sometimes induce a fatal result. During the course of this enquiry, much time has been expended, up to the present, in obtaining a thorough grasp of the peculiar phases of the disease as observed in this country in equines of different breeds. A much longer period may have to elapse before we may be in a position to destroy the resting or developmental forms of the trypanosoma in the body of the host. In cases of equine Surra, we found that the administration of certain chemicals, arsenic and mercury would prolong life from two up to seven or eight months and occasionally in early cases of the disease a cure could be effected. In the majority of instances, the drug, if pushed too far, brought about the death of the host, without impairing to any great extent the vitality of the developmental forms of the parasite the "materies morbi," although the mature trypanosoma was more readily acted upon and could be kept for long periods in check. Again, in the case of camel Surra, it was discovered that equines inoculated with blood from affected camels, during the early stages of the disease, did not succumb within the average period of fifty-five days, but contracted a mild form of the malady, extending for an indefinite period, but marked as in equine Surra by the presence of paroxysms and intermissions. The former extending in the early part of the course of the disease to thirty-one days, whereas after a period of fourteen months had elapsed, the trypanosoma only appeared for a period of a few hours and might not be again discovered for a further period of three to four weeks. Our experiments as to whether the camel trypanosoma finally disappeared from the blood of equines, and whether these animals when inoculated with the virulent form of trypanosoma from equine Surra cases, will succumb as rapidly as before or have acquired a certain degree of protection, can only be answered when the time arrives and the animals now under observation have been tested and the results arrived at. Up to the present time this is also the position with regard to the Dourine parasite. Animals, the subject of advanced disease, exhibiting cutaneous plaques and weakness across the loins have been treated with Arsenic and Nux Vomica or with

Mercuric Perchloride and Potassium Iodide and have improved generally and later a complete cure has been anticipated, for the animals showed no symptoms of ill-health and gained considerably in body weight. This favourable condition was maintained for ten months or a year; but when the same animals were exposed to certain depressing conditions calculated to test to the utmost whether a permanent cure had been effected or whether the plasmoidal or resting form of the trypanosoma had only been lying dormant in small numbers, ready to become active and again increase and multiply when favourable circumstances intervened, or the inhibitory influences which held the further development of the trypanosoma in check were removed. It was then found that within a period of eighteen days, not only were immature forms of the trypanosoma to be found in the blood of the general circulation, but there was a further eruption of plaques, and a fatal termination ensued after a few months' interval. Time has only allowed of my proving experimentally that the trypanosomata of Dourine and Surra respectively may and can be cultivated 'in vitro' by the methods introduced by Novy and McNeal, but sufficient time has not elapsed to allow of experimental inoculations being made with cultivations far removed from the initial virus. Shortly it may be possible, and probably will be, to bring about mitigated forms of the two diseases, and thus confer protection with large or repeated small doses of attenuated cultures of trypanosomata, including the bio-chemical products of the protozoon, elaborated during its development 'in vitro.' Until, however, this further branch of investigation is entered upon and careful experiments are conducted and worked out, positive results being obtained, the prospects in the near future of curing or controlling the vagaries of the Dourine or that of the Surra Trypanosoma are but small.

Section XI.—NOTES ON THE LIFE HISTORY OF THE TRYPANOSOMA.

I. *The trypanosoma, the 'materies morbi' of Dourine.*—The trypanosoma of Dourine differs in size, according to the age of the parasite. It is for the most part smaller in size than the Surra hæmatozoon and considerably smaller than the organism of rat (m. d.). The differences between the trypanosoma of Dourine and that of the rat are most marked. In the latter, the posterior extremity is extremely long and slender, and tapers gradually from before backwards, the micro-nucleus being situated at about the junction of the anterior 4-5th with the posterior 1-5th. In Dourine, on the other hand, the posterior extremity is short and sometimes pointed, but more often it is somewhat rounded and the micro-nucleus is placed within a very short distance of the posterior end of the body. When undergoing division, the Dourine trypanosoma may attain even larger proportions than are usually found in the Surra trypanosoma. A marked feature of the Surra protozoon is the presence of large numbers of highly refractile granules in the fresh state and of chromatin grains in stained specimens which occupy positions anterior and posterior to the macro-nucleus specially if the hæmatozoon is present in large numbers during each paroxysm and shortly before death. In the case of Dourine these granules are not present to the same extent and are smaller in size; further, the undulating membrane is less developed than in the former disease and only one mode of division, namely, the longitudinal, is observed in mature trypanosomata. The process of division may commence at either end or in the centre of the organism. As a rule either the micro-nucleus first becomes elongated and dumbbell shaped and then divides into two parts, or the chromatin body elongates and divides into two. Sometimes a separation is observed first in the flagellum. Finally, division may primarily effect only the anterior and posterior portions of the organism, and these may become free, while the macro-nucleus for the time remain single. The organism is then only fixed by the middle, owing to the late division of the chromatin body. In stained specimens of trypanosomata in conjugation, the micro-nucleus was observed to have divided into two in each parasite respectively and in one organism, the anterior of the two micro-nuclei attained a size twice or three times the size of the posterior one, although those present in the second trypanosoma remained small. In 1891, in order, if possible, to determine the effect of conjugation between trypanosomata, a small quantity of methylene-blue solution was injected into an aural vein of one rabbit suffering from Surra, while a small quantity of eosine in solution was injected in a similar manner into the aural vein of a second rabbit, the subjects of inoculated Surra, during concurrent paroxysms in each animal respectively. Later, blood was drawn from each animal and mixed and the fresh blood submitted to microscopical examination, in order to determine the results of conjugation if possible. In the few examples which came under observation, no coloured particles were seen to leave the body cavity of one and enter that of the second hæmatozoon. Further, the micro-nuclei were not observed to fuse or to alter their relative positions, one to the other, in conjugating organisms.

II. *Mode of entry and subsequent generalization of the organism.*—An equine, stallion or mare, usually contracts the disease during the act of coition. The trypanosoma or its developmental forms are present in the semen of the affected male, and are also frequently present for long periods, but at irregular intervals in the vaginal mucus of the affected mare. The disease is transmitted by the entrance of the trypanosoma, by means of an erosion of the genital mucous-membrane in either sex, but an abrasion may perhaps be unnecessary in some instances. In the stallion the preferential sites for the development of the protozoon appear to be the extremity of the penis and later its sheath. In the mare, the vulva appears to be the usual seat in the majority of cases. Certain changes probably take place at the seat of inoculation of the contagium, for it is unusual for the organism to enter the circulation and bring about a general infection as evidenced by the eruption of cutaneous plaques, until a period of 30 to 34 days have elapsed, from the date of the primary infection. On the other hand, it is not at all uncommon for an inordinate period 10 to 12 months or longer to occur, before any blood infection takes place in stallions, especially if the first symptom of swelling of the sheath is observed, and the animal is immediately segregated, has complete rest, good food, and *covering* is discontinued. The exact date of covering the infected mare which communicated the disease to the stallion, may have been recognized, and no subsequent chance of contracting the disease may have been allowed so that it is possible to accurately fix the date of onset. Although the "materies morbi" of the disease is present in a localized region of the animal, the trypanosoma or its developmental form lies in a dormant state in the tissues but ready to spring into activity at short notice, as evidenced by the fact that when the inoculated animal is subjected to lowering or depressing conditions, further and more advanced symptoms of the malady quickly become apparent. When the trypanosoma has obtained an entrance into the general circulation, the eruption of cutaneous plaques may occur at any time after an interval of a few days, and may recur at intervals for long periods exceeding a year. The exhibition of further symptoms during the course of the disease, be they nervous, articular, or cutaneous, are all due to the presence of the trypanosoma, which has made its entrance into the tissues of each particular part of the body affected, and there brought about inflammatory and other changes.

III. *Where does the trypanosoma rest in stallions during the prolonged latent period characterized by slight tumefaction of the penile sheath ?*—Up to the present time it has not been accurately determined (1) whether the trypanosoma becomes generalized throughout the system in stallions which present for long periods the latent form of Dourine, (2) or the developmental form of the trypanosoma remains dormant in the swollen penile sheath of the affected animal until such time as depressing conditions reduce its vitality.

In one case the semen of such an inoculated animal after the first covering did not appear to contain the trypanosoma or the developmental forms, and the blood from the general circulation did not reproduce the disease when inoculated into a susceptible animal. In some cases it would appear possible for the trypanosoma or rather the developmental forms of the same to be shut off for a time in the affected part, identical changes taking place in the localized swelling of the penile sheath to those occurring during the persistence of a plaque which will be described subsequently. In some cases it would appear as if the trypanosoma is more or less cut off for a period in the lymphatic vessels, for these occasionally may be seen enlarged and more or less varicosed.

IV. *What is a plaque ?*—The Dourine plaque is a form of Urticaria or nettle-rash, the characteristic lesion of which is a raised patch or wheal. Urticaria is an Angio-Neurosis, or affection of the skin dependent on nerve disorder. The patch or plaque is a circumscribed œdema of the skin due to paralytic dilitation of the arterioles, followed by an exudation of serum and migration of leucocytes. According to Neisser, the process in the human subject consists in an increased secretion of the lymph in the neighbourhood of the capillaries of the skin, this in turn causes compression of the vessels and explains the bloodless centre of the patch. The variations in characters of the plaque are due to the different depths to which the infiltration penetrates. In the ordinary form of urticaria, only the upper layer of the integument is affected, while in *U. gigas* or what is called the acute circumscribed œdema of Quincke, the whole thickness of the skin is involved. This form of the disease is characterized by the development of patches of localized œdema of large size. They are hard to the touch, surface more or less round, itching seldom a symptom, only last a day or two and subside as quickly as they come. When there is much loose connective tissue which offers comparatively little resistance to the diffusion of the infiltration, it is termed *U. œdematosa*. The predisposing causes of Urticaria may be divided into topical and systemic, but in this connection we need only consider the latter. It may be noted that "malaria is so strong a predisposing cause, that some writers make a special variety of the affection, under the name of *paludal urticaria.*" Much more, therefore, may we emphasise the eruption of plaques during the course of Dourine, for they are almost pathognomonic of that malady and the chief symptom for arriving at a correct diagnosis.

V. *What is the primary cause of a plaque?*—The imprisonment of the trypanosoma or its development forms in the papillary layer of the skin, the production of a toxin by the protozoon. The toxin produces a vaso-neurosis, dilitation of the capillary vessels, and an increased secretion of lymph in the neighbourhood confined to a circumscribed area. In blood drawn from a plaque shortly after its eruption, the hæmatozoon appears to be perfectly formed, but is small in size, and the undulating membrane is not so well marked as in the mature protozoon. This physical condition might point to the fact that it had developed from the amœboid or plasmodial form, after the latter had been deposited in the plaque, but this is a point which will require further research work. In Surra the course of the disease is marked by the absence of cutaneous plaques, and the eruption of a disseminated but localized Urticaria is far less common than in Dourine. This may perhaps indicate that the trypanosoma of Dourine elaborates a toxin of greater vaso-motor toxicity than the trypanosoma of Surra.

VI. *What changes take place in the form of the trypanosoma during the persistence of a plaque?*—The microscopical changes in the blood or serosanguinous fluid collected daily from the raised cutaneous tumour have been examined in two typical forms of Dourine plaques, *viz.*:—

(*a*) The œdematous plaque.

(*b*) The flat disc-shaped plaque.

(*a*) *The œdematous.*—The plaque No. 2 about to be described as occurring in mare VII appeared on the morning of the 18th August 1903; it was circular in form, 1·5 inches diameter and slightly depressed in the centre. On the 19th its diameter had increased to 2 inches and on the third day the plaque became somewhat oval 2·5 by 2·0 inches, and of meniscus form. During the two following days no change occurred, but between the 23rd and 25th the plaque gradually decreased in size and it had disappeared on the morning of the 26th. A full record of the number and the different forms of the mature and developmental trypanosomata found daily in stained specimens of blood drawn from this plaque have been made. In the subjoined account it will only be necessary to refer to the mature parasite and to its amœboid and plasmodial forms without entering into details with regard to their distinctive features. On the first day the trypanosoma was present in small numbers, each individual protozoon having only one macro and micro-nucleus. In addition, eight amœboid forms were found in two cover-glass specimens of blood. These numbers gradually increased until the fourth day, when eighteen times more trypanosomata were present, but only half the number of developmental forms found on the first day were detected. On the fifth day the numbers remained stationary, and were almost identical with those noted during the previous twenty-four hours.

The sixth day specimens showed a general diminution, in that the number of mature trypanosomata fell to one-tenth of the number seen on the fifth day. During the seventh, eighth, and ninth days of the wheal, no mature organisms were discovered; the developmental forms, however, attained a maximum in number on the seventh, and gradually decreased during the two following days, the ratio of the actual numbers of developmental forms for three days being 7, 4, and 2 respectively. On the 27th August, the day following the disappearance of the above plaque, when examining several blood specimens drawn from the area previously occupied by the plaque, I found one trypanosoma only and this was undergoing longitudinal segmentation.

It would appear from the above (1) that one trypanosoma undergoing division was unable to restart the process of plaque formation, may be its premature removal stopped the further development of the plaque.

(2) On the day after the disappearance of the plaque, when only a slight thickening of the part remained, either the whole of the toxin had been eliminated from the area or sufficiently pure blood or sero-sanguinous fluid was then present to allow of a developmental form being changed into a mature trypanosoma, and later to favour its segmentation.

(*b*) *The flat disc-shaped cutaneous plaque.*—The plaque No. 12 brought forward as an instance, appeared on the R. flank of *Kilngarth* during the night and was observed on the morning of the 21st May 1903. It gradually increased in dimensions from the 23rd to the 27th (1·25 inches diameter) and from the 28th to the 31st May became flatter. On the 1st June it had slightly decreased in diameter and continued to do so until it finally disappeared on the 5th. The trypanosoma was discovered in blood drawn from the centre, on the first and second days after the eruption of the plaque. On the following day, 103 mature protozoa were found in one cover-glass preparation of blood collected from the same spot. The organisms increased and then gradually decreased in numbers and were absent by the 6th day. On this latter date the plaque had increased in one direction only towards the W.; and blood drawn from small punctures in the N. E. E.

and S. E. of the plaque was found to contain the trypanosoma in small numbers, 4 to 5 in a cover-glass in each case respectively. On the 7th day the plaque decreased in height and extended beyond the western boundary. At each of the centres indicated the mature protozoa increased in number from a minimum to a maximum, in one instance from 5 to 5518 in a cover-glass, and then decreased, finally disappearing, only leaving the developmental forms visible on staining. During the extension of this plaque to the W. the trypanosoma was also found in this situation and later passed through the phases above described so that during the fifteen day's persistence of the plaque, different phases in the life-history of the trypanosoma were observable on different dates within the area of the same plaque. The changes which occurred in one portion S. E. of this plaque may be briefly noted.

First day.—Trypanosomata, long, thin, smaller than observed in the mature protozoon, each present a single micro and macro-nucleus.

Second day.—Increasing by longitudinal division in the usual way.

Third day.—All forms present, some with single, others with double micro and macro-nuclei. Individual organisms longer than previously noted.

Fourth day.—

(*a*) Single and double forms of micro and macro-nuclei.

(*b*) Some swollen, much increased in size undergoing longitudinal division.

(*c*) Tadpole shapes, ball (kugel), amœboid and plasmodial developmental forms.

(*d*) Trypanosomata in course of fading with large chromatin bodies.

(*e*) Many organisms exhibiting micro and macro-nuclei well stained and at usual distance apart, but no protoplasm of body visible, edges of refractile undulating membranes can be detected, but they do not stain.

(*f*) Chromatin bodies free in the plasma stained.

5th day.—All forms and stages in the life-history of the protozoon illustrated, many mature trypanosomata presented, well marked vacuoles or halos at and around the seat of the micronucleus both before and after division. Individual organisms each with single micro and macro-nucleus exhibited a number of red granules within the body cavity. In addition the protoplasm of protozoa undergoing division, in the early, intermediate and final stages, just before separation, also contain granules.

6th day.—Slight decrease in number of the mature organisms, while the developmental forms remained stationary with regard to numbers.

7th day.—Great decrease in the numbers of the mature forms, and corresponding increase in the amœboid and plasmodial.

8th day.—Out of fifty-four forms only two mature trypanosomata observed, one a young protozoon and the second undergoing longitudinal division.

9th day.—No trypanosoma present, only amœboid and plasmodial forms discovered.

10th day.—No more mature forms.

In the blood of horses suffering from Surra, the trypanosomata frequently exhibit large numbers of granules, which are especially observable during the height of a Surra paroxysm, *i.e.*, when the hæmatozoa are swarming, but they may be seen in still larger numbers when the protozoa have been swarming in the blood for several days just previous to the death of the host. In 1891, I observed the organism shoot forth a large number of these bright refractile particles into the blood plasma; but although searched for, the same phenomenon has not been noted in the case of the Dourine parasite; nevertheless the same changes would no doubt be seen to take place if the exact moment could be hit off and be made use of in advancing the purpose of this particular observation.

VII. *In what form do trypanosomata leave plaques and again enter the general circulation?*—In plaques which persist for a number of days, certain changes take place as before noted which only allow of the developmental forms of the Dourine trypanosoma returning to the general circulation, but in those plaques which only persist for a few, up to a maximum of 48 hours, the changes noted above have not time to take place, consequently the mature trypanosoma and any developmental forms present probably return, as such, to the blood of the general circulation.

VIII. *Reappearance of a plaque after an interval of a few days on the original site.*—A certain percentage of plaques disappear completely, and after an interval of one to several days reappear at the original site. This is to be accounted for by the fact that after the majority of the developmental forms have been carried away into the general circulation at the time of the absorption of fluid from the first plaque some few failed to escape and were retained *in situ*. As long as the toxin is present in the plaque, the developmental forms of the trypanosomata are unable to reach maturity, but as soon as a certain percentage or may be all the toxin has been eliminated, the inhibitory influence exercised over the growth of the amœboid and plasmodial forms is removed and their development into mature protozoa proceeds unchecked. As they in turn mature, the toxin re-accumulates and the previous changes again occur.

IX. *What changes take place to the trypanosoma in the vaginal mucus?*—As previously recorded, the protozoon is generally introduced in the genital passage of the mare during covering. It may accommodate itself to its new surroundings, and be found in the mucus located in the lower portion of the vagina as early as the 17th or 18th day after intercourse. Whether the trypanosoma is present in the anterior portion of the vagina, or in the uterus, at an earlier date and gradually moves towards the external orifice, has not been definitely decided, but it would appear probable. If successive examinations are made during the course of the disease, the parasite either in relatively large or small numbers may be found in the vaginal mucus for periods varying in length.* Sometimes the maximum number are present shortly after the commencement of the paroxysm and then gradually diminish and they may appear later during that period. The result appears to be the same, *viz.*, periods occur during which the mature parasite is absent from the vaginal mucus. Thus, as in the blood, so in vaginal mucus, paroxysms and intermissions are marked. The two, however, do not coincide, for it frequently happens that subcutaneous plaques appear on the days during which the trypanosomata are absent from the vaginal mucus. Microscopic examination of the mucus elicits the fact that the trypanosomata may be present in small or in vast numbers, and that they in many instances undergo longitudinal division. In some specimens all the recognized forms, mature and developmental, are to be observed, including the irregular and free chromatin bodies. Further, within a few days all mature parasites may have disappeared and only the developmental forms be left. To account for this it would appear probable that the destruction of the mature organisms may be due to the formation of a toxin as in the case of the cutaneous plaques.

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* Since the above was written, in one case the trypanosoma in small numbers has been noted in the vaginal mucus during a period of 45 days without any intermission.

X. *What changes take place at the seat of subcutaneous inoculation, in a susceptible animal, when Dourine blood containing the developmental forms of the trypanosoma is injected.*—The primary changes depend somewhat upon the quantity of blood injected, so that the symptoms exhibited depend more or less upon the mechanical strain to which the tissues were subjected. For example, let us take Donkey I, inoculated with 20 c.c. of blood. On the day following the operation a tense swelling appeared which began to decrease in dimensions after 36 hours and was finally absorbed in a period of eleven days. On the 19th day slight thickening appeared at the seat of inoculation which persisted for 48 hours. On the 21st day a swelling hot and red appeared at the seat of injection which gradually increased in size until it attained its maximum dimensions 36 hours later on the evening of the 23rd day. On the morning of the 27th day, it commenced to decrease and was finally absorbed by the 32nd day. Thickening of the skin, however, persisted until the 75th day. Stained specimens of blood or sero-sanguinous fluid were examined daily during the above interval of 75 days. Between the first and tenth days inclusive, the changes at the seat of inoculation were of an inflammatory nature due to the presence of the injected blood. From the 11th to the 18th day, a period of inaction intervened. During the above periods, no trypanosomata or developmental forms were discovered. During the next twenty days, 19th to 38th inclusive, the fluid collected from the swelling only exhibited the developmental forms of the organism, each presenting one micro and macro-nucleus, respectively. On the 39th day the mature trypanosoma was observed for the first time; in addition, the immature forms were present.

40th day.—No mature organisms, only immature forms present.

41st day.—Trypanosoma again present.

42nd to 46th day.—Mature organisms absent.

48th to 75th day.—No mature trypanosoma discovered.

The period of incubation was a prolonged one—the first immature form being only observed on the 19th day, while the mature trypanosoma was not discovered, until the 39th day. Several paroxysms with intermissions varying in length followed, and finally during a period of 27 days no more mature parasites were found. The "materies morbi" of the disease entered the blood between the 27th and 32nd days following the experimental inoculation. This latter fact confirms the statement already made with regard to date on which the eruption of plaques in horses takes place, *viz.*, 24th to 34th days, but more frequently between the 30th and 33rd days after covering or experimental inoculation

XI. *The blood from the general circulation of an animal, the subject of Dourine, does not exhibit at all periods of the malady the same power of reproducing the disease in susceptible animals* —Except during the height of the eruption of plaques it is unusual during the course of Dourine, to find on microscopical examination, the mature trypanosoma in the blood of the general circulation. In some animals the numbers of cutaneous plaques are comparatively few, appearing singly after long periods of intermission. In others they are very numerous, several appearing daily or every other day; this eruption is continued for a period of several weeks' duration. In the one instance, it is difficult and at times impossible in a susceptible animal, unless a relatively large amount of blood is utilized, to reproduce the disease by subcutaneous inoculation, with blood collected half-way through the period of a prolonged intermission. In the other instance, in an animal where the plaques are numerous, when one or more of them are in constant process of change, and their contents are being frequently voided into the general circulation, the inoculation of that animal's blood into susceptible animals is then of a positive character, for at such times the mature trypanosomata or the developmental forms are always present in the blood. During the period of eruption of numerous plaques, a small dose of blood will reproduce the disease, whereas during a long intermission a dose 100 times as large may be required to bring about a positive result or even the latter amount may prove unsuccessful, for trypanosomata or their developmental forms are generally present in number under the first-mentioned condition, while in the second case they are very sparsely scattered or entirely absent from the blood.

The number of cutaneous plaques which appear in Dourine animals varies considerably, and may be divided into three classes: (*a*) those in which the cutaneous manifestations are well marked; (*b*) those in which they are badly marked; and (*c*) those cases in which they are absent.

(*a*) As an illustration of the first class of cases, I will give that of an Arab stallion. This animal contracted the disease from an Australian mare and exhibited 85 plaques during a period extending over 278 days.

(*b*) An Australian mare contracted the disease from an Arab stallion suffering from the latent form of Dourine. This animal developed four plaques—2 on the 116th day, one on the 150th, and one on the 284th day after coitus.

(*c*) A New Zealand animal, covered by the same stallion, succumbed in 75 days to paralysis without developing any plaques.

From my observations it would appear that the Arab horse is likely to contract a severe from of disease from the Australian breed, whereas the Australian variety as a rule develops a mild form of it from the Arab. But in the case of the mare which succumbed in 75 days, it would seem probable that the trypanosoma entered the system not by an abrasion in the vaginal m. m. during coitus, but by the Fallopian tubes, for subsequent to the act of covering, the os uteri was found to be fully dilated and the sperm had been ejaculated directly into the cavity of the uterus, so that a direct peritoneal infection may have resulted.

XII. *When and why does a plaque disappear?*—As long as the trypanosomata continue to increase in number in a patch, the toxin formed by them increases and the vasomotor disturbance becomes more marked, as evidenced by the increase in area and swelling of the plaque, until finally the mature forms gradually succumb to the toxin. When all the mature forms are destroyed, then during a period of several days only the developmental forms are discoverable in the sero-sanguinous fluid taken from a plaque. Gradually the toxin is eliminated from the plaque, the vaso-motor paresis lessens and finally disappears, the exuded serum is then taken up by the tissues, and the plaque disappears.

XIII. *Blood or sero-sanguinous fluid taken from a plaque is bactericidal 'in vitro.'*—If the blood or sero-sanguinons fluid be collected from a well-marked Dourine plaque, from which the mature trypanosomata have disappeared, and it be mixed with a small quantity of blood containing mature trypanosomata from a second animal suffering from the same disease, it will be observed. on microscopical examination of the mixed fluids, that the trypanosomata are sooner or later acted upon by a something contained in the serum, that their movements become slower and slower and finally cease, and that later a granular disintegration of the parasite follows. On the other hand, the organisms in the second or control specimen of blood containing trypanosomata without added serum retain after many hours almost the same energy in their movements as when the blood was first drawn and submitted to examination.

XIV. *Conclusions:*—Whenever a cutaneous plaque appears during the course of Dourine, the trypanosoma or its developmental form will be found in it if a thorough microscopical examination of stained specimens be made.

During the initial stage of plaque formation in any part of the body the trypanosoma is present there. At a later date, as long as œdema persists, trypanosomata or their developmental forms are present somewhere in the œdematous area.

Mature trypanosomata may not be discovered in the semen of a stallion suffering from Dourine; if stained specimens be made and careful search be carried out, other forms than that of the mature protozoon will be discovered.

The cerebro-spinal fluid of animals which have succumbed to an acute form of the disease accompanied by nervous symptoms contains the developmental forms of the organism.

Developmental forms of the organism are to be found in fluid collected from the secondary swelling arising at the seat of a subcutaneous inoculation with blood from the general circulation of a Dourine-affected horse into a susceptible animal.

In the great majority of instances, mares which contract Dourine from an affected stallion during coitus will sooner or later develop the trypanosoma in the vaginal mucus, and it may be observed at intervals in the mucus during the remaining course of the disease.

Mares subcutaneously inoculated with virulent Dourine blood, in parts of the body other than the external genital organs, may exhibit cutaneous plaques and later cerebro-spinal symptoms, but the vaginal mucus in such cases when free from blood may remain a non-infected agent.

The vaginal mucus of a mare covered by a Dourine-infected stallion has been found to contain the trypanosoma of Dourine some months later, without the animal exhibiting any symptom of the disease or of ill health.

Flies may convey the trypanosoma of Dourine and produce infection in healthy susceptible animals, as is the case with the Surra trypanosoma, by direct inoculation, but no evidence has been brought forward up to the present time to show that flies act as an intermediary host.

Just as cattle and camels are capable of bearing the trypanosoma of Surra or its developmental forms in their blood, for periods from one to three years, so certain breeds of horses can maintain the 'materies morbi' of Dourine in their systems for periods of from one to four years in India.

Section XII.—NOTES ON VESICULAR EXANTHEMA OF HORSES.

Vesicular Exanthema in horses is usually benign in character, although the severe form may occur accompanied by grave complications such as high fever, suppuration, and emaciation, which form occasionally terminates in death. Infection is usually conveyed from animal to animal by coition, but mares may become infected from other mares. Young sucking animals may contract the disease on the lips, mouth and on the m. m. of the nose and eyes. One attack confers no immunity, for an animal may recover and become again infected within a period of a few weeks. The disease is transmissible from animals to men, especially to the hands of attendants, in a form which resembles small-pox. The patient always makes a rapid recovery.

Précis of Cases.

Mare II.—Australian mare, aged . On 7th May 1903, during a period of œstrum, this animal was covered by an Arab stallion *Yadgir*, for a long period the subject of latent Dourine. A sore was observed to exist over the root of the free portion of the penis while covering. No symptom occurred until the morning of May 16th (10th day after covering), when a small ulcer was observed inside the left labium of the vulva, and twenty-four hours later fresh vesicles were noted, each surrounded by a halo red in colour, while there was an eruption of successive crops of vesicles which later formed ulcers and then disappeared. On the morning of the 27th all signs had disappeared.

Mare V.—A New Zealand mare, aged 7 years, was covered by an Arab stallion *Yadgir* (suffering from Dourine) on the 11th and 13th May 1903. The horse presented a small sore on the anterior and superior surface of the free portion of the penis. A vesicular eruption appeared on the external genital organs of the mare on the 21st May; by the 23rd these had formed ulcers from which a sticky, viscid fluid exuded, which dried and formed a film over the surface of each individual ulcer. Marked swelling of the external genitals followed. The primary symptoms persisted until the 5th June, when the dry films commenced to loosen at their edges and later to separate; they then disclosed patches destitute of pigment (leucoderma) on the site previously occupied by each ulcer.

Mare VII.—A country-bred mare, aged 4 years, was covered during a period of œstrum by an Arab horse *Monarch* on the 30th June and 3rd July 1903. At the time of serving the mare on the first occasion, the penis of the animal was clean and free from any sores and no symptoms followed the union in the mare during the next 72 hours. After the second serving, small ulcers were observed for the first time on the free portion of the penis of the horse; the organ, however, was not noticed to be abnormally enlarged or discoloured. Within a period of twenty-four hours after the last covering, symptoms of vaginitis had made their appearance. The external surface of the vulva, the inner surface of the labia pudendi and the vaginal m. m. presented vesicles in different stages of development. The symptoms of vesicular exanthema affected the external and internal tissues concurrently, but may here be described separately. The external manifestations on the vulva were first observed 18 hours after the last covering, when vesicles were noted to be dotted over the outer surface of the labia pudendi. Twenty-four hours later, the eruption of vesicles had considerably increased and implicated the surrounding parts in close proximity to those previously affected.

On the 6th July, each individual vesicle appeared upon a raised and swollen base, some more marked than others, the contents of which were then becoming opaque and of a yellowish tinge; later all formed pustules, which more or less persisted from the 7th to the 11th inclusive. On the morning of the 12th most of the contents of the pustules had become evacuated and open sores or ulcers remained in their place. Twenty-four hours later, the process of healing commenced and was maintained under scabs until morning of the 17th, when some of the latter separated and fell off, leaving patches of leucoderma according to the area of the tissues involved in the inflammatory changes. Between the 18th and 22nd, the healing process continued and was completed by the latter date. The primary symptoms of the 4th July affecting the vagina, as before stated, consisted of an eruption of vesicles on a highly inflamed m. m. Within 24 hours the maximum eruption of vesicles had taken place, and some had already formed superficial ulcers, a form which all assumed later by the same evening. From the 6th to the 13th the ulcers remained patent, probably on account of the muco-purulent discharge which appeared on the 10th and persisted for 48 hours, when its place was taken by a sero-sanguinous discharge on the 12th which made its escape from the vaginal orifice, but it had totally disappeared on the morning of the 31st. The process of healing set in during the 14th and all ulcers had healed by the following day. The vaginal discharge ceased on the 2nd August.

Mare VIII.—A country-bred, aged 8 years, was covered by an Arab stallion *Monarch* at noon on the 5th July 1903. At the time of serving numerous small ulcers existed on the m. m. of the free portion of the penis. On the morning of 6th July, 19 hours after covering, vesicles had already appeared on the inner surface of the labia pudendi and on the vaginal m. m. On the 7th and 8th, the vaginal m. m. presented a deep-red colour and numerous small ulcers existed over its surface and a muco-purulent discharge escaped from the passage. On the 9th, a second series of symptoms appeared complicating the vulva and tissues situated externally.

(*a*) From the 9th to the 17th inclusive, the vaginal symptoms increased in severity, and between the 18th and 20th, some of the ulcers on the m. m. healed. On the 21st, the trypanosoma was observed for the first time in the vaginal mucus, the muco-purulent discharge was on this date intermittent in its appearance, for the most part being only observed in the morning and evening. Twenty-four hours later petechiæ appeared on the m. m. and persisted for several days; they then faded and finally disappeared on the 23rd, and by the morning of the 26th all ulcers on the m. m. had healed.

(*b*) The external manifestations above referred to were first observed on the morning of the 9th, when vesicles and pustules raised above the surface of the surrounding tissues, both discrete and confluent, were found on the vulva and tissues surrounding the part. During the next 48 hours fresh vesicles and pustules formed, while the ones which previously existed developed into ulcers, and from the 12th to the 15th, the evolutionary process continued, some ulcers healing whilst fresh ones formed. During the 16th and 17th, the condition appeared to remain stationary, but from this latter date healing proceeded without interruption. On the 31st July, the vulva became thickened and generally enlarged, and on the following day numerous black film-like scales became denuded, leaving eight patches of leucoderma.

TABLE IX

Showing the dates on which symptoms of Vesicular Exanthema appeared and disappeared, together with the date of the first appearance of leucodermic areas in each animal respectively attacked.

Name or number of animals	Breed	After covering or inoculation.	Date of covering or inoculation.	By or from which animal covered or inoculated.	Vesicular exanthema present or absent.	Date on which Vesicular Exanthema		Leucoderma.	Day after covering or inoculation leucoderma appeared	Remarks.
						Appeared	Disappeared	Date of first appearance of white patch		
			1903					1903		
Shamsher . .	Arab	Covd	Feb. 22nd .	Mare I .	Absent .	*Nil.*	*Nil*	*Nil*	*Nil.*	
Kilngarth . .	T B English	,,	April 3rd	Mare I .	Absent .	*Nil.*	*Nil.*	*Nil.*	*Nil.*	Sore over root of penis small circular cicatrix followed.
Yadgir . .	Arab.	,,	May 7th .	Mare II	*Present* .	May 11th .	May 20th .	...	...	
Vendor . .	T B. Aust.	,,	June 24th	Mare I .	Absent .	*Nil.*	*Nil.*	*Nil.*	*Nil.*	
Mare I . .	Aust.	,,	April 3rd .	*Kilngarth* .	Absent	*Nil.*	*Nil.*	*Nil.*	*Nil.*	
,, II . .	,,	,,	May 7th .	*Yadgir* .	*Present* .	May 16th .	May 27th .	Aug. 4th .	90th	
,, III . .	,,	Inoc	April 17th	*Kilngarth* .	Absent .	*Nil.*	*Nil.*	June 12th .	57th	
,, IV . .	,,	,,	April 17th .	*Kilngarth* .	Absent .	*Nil.*	*Nil.*	*Nil.*	*Nil.*	
,, V . .	N Zealand. B.	Covd	May 11th .	*Yadgir* .	*Present* .	May 21st	June 5th .	June 5th to 11th.	26th-32nd	Sore over root of penis *Yadgir.*
,, VI . .		,,	June 11th .	*Monarch* .	Absent	*Nil.*	*Nil*	*Nil.*	*Nil.*	
,, VII . .	,,	,,	June 30th .	,, .	*Present* .	June 20th .	July 17th .	July 17th .	18th	
,, VIII . .	,,	,,	July 8th .	,, .	*Present* .	July 6th .	*Nil.*	Aug. 1st .	24th	Leucoderma anus 124th day. ,, scrotum 126th day. ,, sheath 140th day.
Monarch . .	Arab.	,,	May 4th .	Mare III .	*Present* .	July 3rd .	July 30th .	July 30th .	86th	
Donkey III . .	C. B.	Inoc.	August 4th .	*Monarch* .	Absent .	*Nil.* .	*Nil.*	*Nil*	*Nil.*	

Symptoms.—The parts generally affected in equines are the mucous-membrane of the penis in males and the cutaneous covering of the vulva and m. m. of the vagina in females. The period of incubation, according to our observations, varies from within twenty-four hours to 10 or 11 days. In mild cases there appear small vesicles on the inner surface of labia pudendi, the vaginal mucous-membrane is red and inflamed, or the vesicles may be surrounded each by a red halo. The vesicles contain a clear, transparent fluid, but as the vesicle gets older, its contents change to an opalescent hue and later to a yellow colour. When these evacuate their contents, small ulcers form with flat bases and irregular edges which secrete a sticky glairy fluid of a light yellow tinge. Concurrently or at a later period the same changes may occur on the external surface of the vulva, and may implicate the structures on either side of the vulva, the anus and the under-surface of the root of the tail. But in these latter situations the eruption exhibits the following characteristics. Each individual vesicle appears upon a raised and swollen base, some more marked than others, later all form pustules, discrete or confluent, their contents presenting a light or dark shade of yellow to orange. After persisting for a period of 4 to 6 days, the contents of the pustules are evacuated, open sores or ulcers form somewhat flat and with irregular outlines. Within a period of 24 to 48 hours the healing process commences and continues under scabs, the whole process from vesicle to separation of scabs occupying from 11 to 17 days, although a chronic vaginitis may persist after other symptoms have disappeared. The scabs vary in colour from brown to black. When healing has taken place, scabs and film like coverings, the consistency and thickness of collodion scales commence to separate and circular or irregular shaped unpigmented patches are left which constitute leucodermic areas, and when numerous, give a piebald appearance to the affected tissues. In stallions, such areas have been observed on the scrotum, and in one instance the tissues of the anus were involved. No constitutional disturbance is present in the benign form of the affection, and the temperature does not usually vary except within very normal limits 37 to 38°C.

Our experiments include six mares which contracted Dourine spontaneously from stallions, and two which contracted the disease after the inoculation of a trace of blood on the scarified vulva. Of the six spontaneous cases, four showed leucoderma subsequently. Of the two inoculated cases, one showed leucoderma. Therefore, leucoderma is not a necessary sequela of Dourine when contracted spontaneously or following inoculation on the external genital organs. It was, however, certain that some of the animal contracted two diseases, *viz.*, Dourine and Vesicular Exanthema, and for the first few weeks their course ran concurrently. Further, that two of the animals (stallions) exhibited, at different periods, sores on the penis, and a third stallion had no eruption of sores. The mare No. I covered by the stallion (*Kilngarth*) which had no sores on the penis never presented any symptoms of Vesicular Exanthema or leucodermic patches on the vulva or adjacent parts. Mares Nos. II and V covered by *Yadgir* during the persistence of sores contracted Vesicular Exanthema and later developed leucoderma, whereas mares Nos. VI, VII, and VIII covered by *Monarch* presented different symptoms according to circumstances. Mare VI was covered before the eruption of sores on the penis and never developed Vesicular Exanthema or leucoderma, whereas mares Nos. VII or VIII covered at the time the sores were appearing or during their persistence, both suffered from marked symptoms of Vesicular Exanthema and developed leucodermic patches as early as the 18th and 28th days respectively after the date of covering. From the above facts it would appear certain that those animals which were covered by a stallion on whose penis sores were present, contracted a second form of disease and leucoderma followed as a consequence. But the inoculated cases mares III and VII were never exposed to the risk of contamination or contracting Vesicular Exanthema from a stallion, and one animal, mare III, exhibited the most marked leucodermic changes, whereas the other one showed no symptoms. Therefore, the most marked form of leucodermic changes were observed in an animal that had not suffered from Vesicular Exanthema. Further, sores appeared on the penis of a stallion and produced a second form of disease of a severe character, although a few days previously, on covering a mare, no 'contagium' or bad results followed the union, and in a second stallion *Yadgir*, presenting a sore at the time of covering, both mares covered by this horse suffered from Vesicular Exanthema, although previous to the appearance of the sore no symptoms followed in the mare. It would appear, therefore, that another organism developed in the sores which produced the secondary infection, for no trypanosomata or their developmental forms were discovered in fresh or stained specimens of material from the sores.

As a diagnostic symptom, what deductions can be drawn from the presence on the external genital organs of non-congenital areas of leucoderma?

There is no doubt that any form of inflammation, if sufficiently severe affecting the cutaneous tissues of the external genital organs and those in close proximity, will bring about changes which, when the healing process has concluded its task, will leave unpigmented areas of patches of leucoderma. It has been demonstrated during the course of the two maladies, Vesicular Exanthema and Dourine, that each is accompanied by a sufficiently severe form of inflammation to produce the above changes. When leucoderma which is not congenital is present in an animal, stallion or mare, it should therefore be regarded with suspicion, and every needful precaution exercised. In the present state of our knowledge we cannot say more than that in countries where the two diseases are enzootic, in all probability, the animal has passed through an attack of Vesicular Exanthema or one of Dourine, most likely the former. For if the animal is in good condition and apparent health, it would point to the fact that the previous disease had been Vesicular Exanthema, for during the course of the latter disease 70 per cent. are said to succumb to the malady, and but a small percentage of the remainder would ever regain perfect health and condition.

Section XIII.—PYROPLASMOSIS.

In the bovine, equine, ovine, and canine species, diseases have been described in one or other parts of the world which differ somewhat, but which in a percentage of cases are associated with hæmaturia or with hæmo-globinuria: the 'materies morbi' being in each instance a form of *Pyroplasma*. The disease presented by each species of animal respectively is more or less, inoculable into one or other species. The Pyroplasmata have been classified up to the present as follows:—

(i)	Piroplasma	bigeminum	.	P. of ox.
(ii)	"	equi	.	" horse.
(iii)	"	ovis	.	" sheep.
(iv)	"	canis	.	" dog.

The organisms penetrate into the red corpuscles of their host and bring about their destruction in acute cases, the principal symptoms presented being anæmia, hæmoglobinuria, and jaundice more or less marked. It is known that the disease is carried to bovines and canines by various species of ticks (ixodes), and there is but little doubt that in the other animals attacked ticks may also act as carriers. The disease caused by the presence of the above-mentioned Pyroplasmata may be either an acute or a mild form. In most countries the acute form makes its appearance in the summer and autumn, while the mild form usually is present during the winter or early spring, but the two forms of the malady may be present and run their course in different animals of the same species, belonging to the same herd concurrently, during the same season of the year. The various forms of Pyroplasmata which bring about disease in the different species of animals above mentioned belong to the class *protozoa.* They vary considerably in form, presenting pear-shaped, oval, spherical, and round bodies, for the most part occupying the interior of the red corpuscles, but are also not frequently found in varying numbers in the blood plasma. As to size, they vary very much from time to time in the same host, but the range is from a mere speck 0·25 to 3·5 mikrons in length. In bovines the Pyroplasmata are associated in pairs, but in other animals, and occasionally also in the former, one finds them in multiples of two up to eight in one corpuscle, but the latter number is the maximum and rare. Each pair of organisms are connected in some way to each other, generally in *P. bigeminum*, by a very fine filament extending from their tapering extremities. In the red corpuscles they are endowed with amœboid movements and are but rarely observed to occupy the same position for long in fresh specimens of blood.

(*a*) *Texas Fever.*—In December 1902, I reported to Government that Hæmoglobinuria or Texas Fever due to the presence of the 'Pyroplasma bigeminum' had made its appearance spontaneously in plains cattle at the Bareilly Laboratory, some days after being subcutaneously inoculated with virulent rinderpest blood derived from hill bulls at Muktesar, elevation 7,500 feet above sea level. Of the two animals primarily affected with the above-mentioned disease, one was brought from near the Ramganga river and the second from a district bordering on the Jumna. Both animals had been inoculated with rinderpest, one six weeks later than the other, but in both instances the symptoms of the second followed before those of the primary disease had disappeared from the affected animals, and on microscopical examination of their blood 60 and 62 per cent. respectively of the red blood corpuscles were found to contain the organism of the disease. The control rinderpest blood utilized for inoculation purposes was found to be free from the 'materies morbi' of Texas Fever, and no other cattle out of some 90 inoculated showed symptoms of the latter malady, so that it was not contracted at the Bareilly Depôt from the infected rinderpest blood. It would therefore appear that the 'Pyroplasma bigeminum' is able to lie dormant in the systems of some of the plains cattle of this province, until such time as the restraining power present in the blood has been modified or removed, when it again assumes an active state and the reduction or entire removal of the hereditary or acquired resistance to the organism may in some cases be materially hastened by such animal passing through an attack of (inoculated) rinderpest. Ticks (ixodes) more or less replete with blood picked of the bodies of the affected bovines are capable of transmitting the disease, and young ticks hatched out from the eggs, many weeks later, are also able to communicate the disease when they attach themselves to susceptible animals.

(*b*) *Pyroplasma tropica.*—Whether the years 1903-04 were exceptional ones in the plains of India I am not as yet in a position to say, but all animals which have come under observation, of whatever species, with the exception of bovines and buffaloes received from the Himalayan regions at Muktesar, have without exception respectively exhibited pyroplasmata in their red corpuscles and free in the blood plasma. Further, all Himalayan animals, bovines and buffaloes, after coming across the Bhabar and

Terai regions, belts of land lying between the foot of the outer Himalayas and the Bareilly district, have exhibited the same organisms. The presence of these pyroplasmata are not confined to the Bareilly district, but are more or less scattered over a large area of North India, as the following facts show. *Shamsher* and *Kilngurth* respectively brought the organism in their blood from the North Punjab. Three mares railed direct to Kathgodam from Hapur Remount Depôt, in May 1903, exhibited the organisms in their circulations a few days after their arrival at Muktesar. Donkeys taken to Muktesar, July 31st, 1903, exhibited the parasites in the red blood corpuscles shortly after their arrival. Specimens of blood from brood mares suffering from Surra and guinea-pigs inoculated with blood from the affected animals, in the Mamdot State (near Ferozepur), Punjab, all exhibited the organisms in their respective circulations. Bovines from Bareilly, Hamirpur and Bijnor districts, all exhibited pyroplasmata on arrival at the Bareilly Depôt. Three camels which arrived from Bikanir, in November 1902, were free from the parasites on their arrival in Bareilly and up to the middle of April 1903, but two succumbed during the rains and the third had contracted the organism by November 1903 during the interval.

At the present date the following animals in the Bareilly Depôt are the subjects of spontaneous or inoculated pyroplasmosis :—

1.	Bovines—plains and hill animals	(S)
2.	Buffaloes—plains and hill ,,	(S)
3.	Equines—Thorough-bred English, Australians, Arabs, country-bred horses, tatoos and donkeys	(S)
4.	Camel—From Bikanir	(S)
5.	Goats and kids, the latter a few weeks old	(S)
6.	Sheep from Bareilly district	(S)
7.	Dogs—English imported and pariahs	(S)
8.	Rabbits—country-bred	(Inoc.)
9.	Guinea-pigs	(Inoc.)
10.	Rats (Mus-dec.)	(Inoc.)
11.	Cats	(S)
12.	Monkeys	(S)

Among animals not possessed by us, the organisms have been found in the red corpuscles and plasma of elephants and several kinds of deer.

The blood of an eighth month foal born dead, mother a hill pony, exhibited all the different forms of the pyroplasma in the red blood corpuscles and blood plasma; the blood of a donkey fœtus, about 5th month, also contained the pyroplasma. So that the parasite is capable of passing from the maternal to the fœtal circulation, through the walls of the placental vessels.

It would appear that man and animals alike all present the same species of pyroplasma, but modifications in the specific characters of the hæmatozoon probably are developed during the passage through the different animals. In February 1903, one gwalla, a pahári, suffered at Bareilly, during the prevalence of Texas Fever in cattle, from benign Tertian, associated with a pyroplasmosis, during which serious symptoms of a remittent type of fever were present together with intermittent attacks of hæmoglobinuria, lasting for three weeks in all. During the present cold season, the blood of one Veterinary Assistant Janki Nath, a native Laboratory bearer, and my own, have exhibited the same forms of pyroplasmata. Slight accessions of fever very seldom exceeding a maximum of 37·6°C. (99·8°F.), hemicrania, sweating after the slightest exertion, but with complete absence of hæmaturia or hæmoglobinuria, were the symptoms always associated with the presence of the pyroplasma in the blood of man. It is well known that cattle and dogs contract the disease from the bites of ticks, and it is more than likely that equines and ovines and probably camels become infected by the same species of parasites. But man is not troubled with ticks except under exceptional circumstances, and therefore it is necessary that some other carrier be found. One has not very far to look for at the time of the year when this form of disease is most rife. Anopheles have not yet developed and only the *Culex fatigans* is to be observed. A full account of the life-history of the organisms found and their connection with the Ixodes, Culicidæ, and the Diptera generally, together with the symptoms produced in the host, will be published separately.

Section XIV.—SUMMARY OF SYMPTOMS OBSERVED AND PRESENT CONDITION OF SEVERAL ANIMALS SINCE THE DATE OF SUBMISSION OF THE REPORT IN MARCH TO OCTOBER 18TH, 1904.

As a period of six months has elapsed between the submission of the Dourine Report to Government and the furnishing of proofs, an opportunity has been afforded to place on record the most important symptoms and the condition of the several animals during the afore-mentioned period.

In the following notes, the principal points of interest will be found concerning each individual animal.

On the 5th April 1904, the animals were removed from the Bareilly Branch Laboratory to the Hill station or Central Institute at Muktesar, and up to the date of writing, 15th October 1904, have spent the hot season and rains at an elevation of 7,500 ft.

Shamsher.—The last plaque to appear was No. 19, on January 12th, 1904. Since that date up to the middle of October 1904, the only symptoms noted were the periodical augmentation and diminution in size of the sheath and the œdema on the under-surface of the abdomen. The rectal temperature of the animal noted twice daily during the past six months has only varied once from between the limits of 37° C. and 38·4° C., *viz.*, on the evening of the 17th July.

Present condition.—October 18th, 1904.—Good condition, sheath and scrotum large. Scrotal œdema of old standing appears to be organized.

Kilngarth.—The date of appearance of plaque No. 43 mentioned in the body of the report was April 2nd, 1904. Up to the middle of September of this year, when the death of the animal occurred, 11 additional plaques made their appearance and two, Nos. 52 and 54, were still present at the time of death.

A muco-purulent discharge from the left nostril made its appearance on 21st June and continued off and on until the date of death. The œdema of sheath likewise persisted during the above-mentioned period. The temperature for the most part varied but little between 37 and 38°C., but for the four weeks just previous to death the readings became more varied, and on several occasions the evening observations recorded were between 38·5 and 39° C.

Post-mortem notes not forthcoming.

Pony XIII.—C. B. mare, aged 10 years, was inoculated subcutaneously with 20 c.c. of slightly opalescent cerebro-spinal fluid collected at the autopsy on *Kilngarth* held on the 12th September 1904, 2 hours after death. The fluid was injected into Pony

XIII, 6½ hours *post-mortem*. On the 18th September a swelling measuring 5 × 4 × 0·25 inches was present at the seat of inoculation, on the following day it had decreased considerably, and after about 70 hours' had become absorbed. No symptom was noted between the latter date and October 12th, a period of 27 days. Patches of leucoderma about the anus and vulva became apparent and were noted for the first time on October 13th. As no secondary swelling occurred at the seat of inoculation, it would appear as if the injected fluid found its way into the general circulation and that a general infection took place and not a localized one as in the case of the other animals. No vesicular exanthema has developed, as this mare has not been covered by any stallion and no external manifestation had developed. Therefore the leucodermic patches on the anus and vulva must have been due to the trypanosoma in the general circulation. No eruption of plaques has taken place or other symptom of Dourine except the ones noted.

Yadgir.—From the arrival of this animal in the hills after a march of 28 miles on April 9th, 1904, no plaques made their appearance on the cutaneous surface of the body until 24th May, when three were visible on the same morning; disseminated urticaria was observed on the left side of the neck on 21st June and persisted for some days. During the month of July, four plaques were noted, *viz.*, Nos. 45 to 47, the latter reappearing and persisting for a period of eight days; in addition, the œdema of the sheath and under-surface of the abdomen persisted and the off hock and fetlock were swollen. The latter symptoms were stationary during the following month, but no fresh plaques appeared until September, when two were noted, and up to the middle of October two fresh ones have appeared, Nos. 50 and 51.

Temperature scarcely varied from between 37° and 38° C. It was calculated that the disease had already existed for 232 days on April 3rd, 1903, on which latter date No. 1 plaque made its appearance, and on March 21st, 1904, the 590th day, just before this report was submitted, 40 plaques had made their appearance. At this date, October 15th, 798 days since the first symptoms of Dourine were observed, fresh plaques are still erupting and persist.

Present condition: 18th October 1904.—Fair condition. Œdema increasing. Œdema of sheath also increasing. Disseminated urticaria involving whole cutaneous surface of body.

Monarch.—Up to the end of March 1904, this Arab stallion had exhibited 88 plaques on various parts of the body and during the past six and a half months, April to October 15th, 55 fresh plaques have appeared, *viz.,* 16, 6, 16, 9, 2, 1, and 5 in the respective months. It would appear in this animal's case that the march of 28 miles up to Muktesar had accelerated the eruption of plaques, for but 10 had been noted in the 6 months in the plains previous to starting for the hills. The first plaque appeared on June 6th, 1903, and the last was seen on 18th October 1904; so that in a period of 16½ months 143 plaques made their appearance. The temperature for the most part varied but little between 37·5° and 38·5° C. On the evening of 3rd September the temperature rose to 40° C., a variation of more than two degrees from the morning record; at the same time the animal was found to be lame in the near hind limb. In the course of 60 hours the temperature approached the normal.

Present condition: 18th October 1904.—Plaques disappearing from both hips. No œdema of belly, but slight œdema of sheath. Slight paresis.

Mare II.—During the further period of observation between February 14th and October 1904, no further plaques made their appearance and no symptoms except those previously noted were observed.

Present condition.—Fair condition, leucoderma of anus, vulva tumified. No œdema or plaques visible.

Mare IV.—Two further plaques, Nos. 22 and 23, other than those noted up to March 19th, 1904, were observed within the first few days of April, but since that no cutaneous lesions have made their appearance. The temperature has remained within normal limits.

Present condition.—October 18th, 1904. Condition good, No plaques. No œdema. Vulva normal. Scaly condition of cutaneous surface of abdomen.

Mare VI.—Between July 11th, 1903, and January 8th, 1904, 75 plaques appeared on the cutaneous surface of the body. An interval of over thirteen weeks then elapsed without any having been observed. The animal was transferred from the plains to the hills during the first week of April. On the 3rd morning after arrival from a march of 28 miles, the 76th plaque was noted, and No. 77 after further interval of nearly 7 weeks. At the time of writing, October 15th, 1904, no symptoms have developed during a period of 4½ months. Temperature remained within normal limits.

Present condition: 18th October 1904.—Condition good. Slight œdema of belly. No leucoderma. Vulva normal.

Mare VIII.—On the 20th October 1903, plaque No. 19 appeared and persisted for a period of 18 days. Between the above dates and May 19th, 1904, no cutaneous lesions were noted, but on the following day No. 20 plaque appeared and on the 12th June No. 21, since which latter date no further plaques have become manifest. Temperature remained within normal limits.

Present condition: 18th October 1904.—No œdema, two white spots. Vulva swollen. No plaques. Losing condition.

Donkey No 1. Mare.

Inoculated with 20 c.c. of blood drawn from the jugular vein of *Monarch* on the 15th December 1903. Animal pregnant. The last note on 29th February 1904, no symptom of Dourine was present. On the night of the 10th May, a healthy foal was born; no complications On the morning of the 18th May there was a slight rise of temperature 39°C.; next morning it registered 40·2°C., and on the morning of the 20th, 40·4°C. There was swelling of the near fore-knee which was hot and tender. These symptoms increased from the 18th to the 20th May and persisted until the 13th June. Between the 24th and 30th May, three plaques appeared on the cutaneous surface of the chest and abdomen measuring from 1 to 3 inches in diameter. These persisted for 7, 4, and 3 days respectively. No variations in the temperature from the normal were noted.

Present condition: October 18th, 1904.—Swelling of right labium. Good condition. *Foal* good condition. No symptoms of Dourine noted.

This experiment demonstrates the fact that the Dourine trypanosoma or its immature form was present in the blood of the Arab stallion during the intermission of eruption of plaques between 8th December 1903 and 9th February 1904, *i.e.*, between 219th and 282nd day.

Although the trypanosoma had been observed in the sero-sanguinous fluid removed from the swelling at the seat of inoculation on the 5th January 1904, no plaques made their appearance on the cutaneous surface of the body until 24th May, seven days after parturition, and consequent loss of power of resistance which followed.

A period of seven days elapsed between the disappearance of the temporary swelling caused by the injection of the blood subcutaneously in the first instance, and the appearance of the secondary swelling at the seat of inoculation due to the development of the trypanosoma *in situ*.

Further, a period of seven days elapsed between the birth of the foal and the rise of temperature and swelling of the right fore-knee.

The foal has exhibited to date no symptoms of disease, so it will be inoculated with the Dourine trypanosoma in order to ascertain if any protection has been afforded in *uterô*.

Present condition: October 18th, 1904.—Good. No symptoms visible.

Donkey Stallion No. III.

This experiment demonstrates that, although the trypanosoma of Dourine could not be found microscopically in the blood of the affected animal at the time of inoculation, nevertheless when a relatively large quantity was injected subcutaneously into a healthy animal (Donkey) not only was the disease contracted by the inoculated animal, but plaques appeared during the early days after inoculation (33rd) and aversion of the mucous-membrane of the *meatus-urinarius* occurred at a later date. This is the first occasion on which Dourine plaques have been noted in donkeys in this country.

Donkey Stallion No. IV.

No symptom other than eversion of the *meatus-urinarius* has become manifest since the 29th December 1903, but that the animal is the subject of Dourine there is no doubt; up to the present, however, the "*materies morbi*" has lain dormant.

Present condition: October 18th, 1904.—Good; no symptoms.

Pony Mare No. 6.

On February 29th, 1904, this animal showed no symptoms of Dourine, and no further ones were noted until 9th March, when the temperature gradually rose from 37·3°C. to 40·3°C. on the evening of the 11th. It then suddenly dropped and on the following morning registered 37·3°C. A further rise to 39·5°C. took place on the same evening, but again reached normal limits on the morning of the 13th. Slight exacerbations of temperature occurred on subsequent occasions, *viz.*, the 31st July maximum 39·6°C., August 7th 39·4°C., September 6th 39·0°C., but no other Dourine symptoms were noted.

Present condition: 18th October 1904.—Rough. Condition normal.

Pony Mare No 7.

On 20th March 1904, temperature 37·0°C., gradual rise, maximum 39·6°C., on evening of 23rd March gradual reduction until normal temperature recorded on morning of the 28th.. Again, 12th July 1904 temperature 37·1°C., rise until evening of 13th, when maximum temperature 40·6°C. registered. Following evening 40·3°C., sudden fall during night, 37·9°C. registered at 8 A.M. 15th, and 37·1°C. on the 17th.

No symptoms noted.

Present condition: 18th October 1904.—Both lips of vulva thickened and slight nodular formation involving both. Condition fair.

Section XV.—APPENDICES.

SHAMSHER.

Arab stallion, the subject of spontaneous Dourine of some months duration, under observation for two months at the Punjab Veterinary College and treated for a time with Arsenic and Nux Vomica, return of plaques and other symptoms when treatment discontinued. Presence of trypanosoma demonstrated in blood from plaques, but not in that drawn from general circulation. After arrival at Imperial Bacteriological Laboratory, Bareilly, submitted to a further period of observation for 15 months, during which time additional manifestations of the disease were observed, including eruption of plaques, swelling, and œdema of sheath, scrotum, and under-surface of the abdomen, etc.

A bay Arab horse, 14-1½, age 4½ years on 1st December 1898. Sire Arab stallion *Koheilan*, was landed in Bombay on 15th December 1898. The following are the names of the places and the dates, as far as are known, where the stallion has been stationed :—

Jhelum (District Board)	5th February 1899.
Chakwal " "	3rd March 1899.
Lahore Veterinary College	8th October 1902.
Imperial Bacteriological Laboratory, Bareilly	10th December 1902.
Do. do. do. Muktesar	13th April 1903.
Do. do. do. Bareilly	14th November 1903.

This animal was admitted to the Hospital of the Punjab Veterinary College for treatment on the 8th October 1902. Horse in good condition, coat glossy and soft; temperature 10°F. Horse looking well with the exception that the scrotum was enlarged and suppurating, and the external inguinal glands were also enlarged; the condition being similar to that of *Harden*. Appetite good.

On the 9th October temperature rose to 104°F., but fell by next day. The animal was put on Arsenic and Nux Vomica for a week, and the abscesses lanced and washed with Perchloride. There was apparently some improvement, but on the Arsenic being discontinued for ten days, characteristic Dourine patches appeared, and in them the organism was found. Daily observation of the blood from the general circulation failed to show any trypanosoma. The case continued as usual, now an eruption of the characteristic patches, skin clean. Temperature varying but slightly and not above 101°F. Appetite good and condition fair. This horse was handed over to the Imperial Bacteriologist for observation in December, and arrived at Bareilly on the morning of the 10th December 1902. The condition of the animal was as before noted except that the temperature was normal and the scrotal wound had ceased to suppurate and a wound existed on the right side of withers. The horse remained under observation for a long period. Between 10th December 1902 and up to 31st January 1904, eighteen plaques had made their appearance in all; the first on the 20th December 1902 and the last on the 18th December 1903. The

Trypanosoma was frequently demonstrated in blood drawn from the plaques of recent date. On reference to the Table it may be observed that the length of the periods intervening between the successive appearance of any two plaques varied considerably; in the cases of Nos. 3 and 4 and Nos. 17 and 18 plaques the periods were one and eighty days respectively. No. 1 plaque, which became visible 30th December 1902, was particularly noticeable on account of its being one of the few patches observed which might be called typical and which agreed with the descriptions applied by some observers to the Dourine plaques, *viz.*, "As if a metallic disc had been placed under the skin of the animal." In addition to the pathognomonic patches, disseminated urticarial eruptions of a fugitive character made their appearance at varying intervals of two to six weeks; as a rule implicating a different region of the animal's body during each manifestation. In this case, twenty-four hours to three days embraced the usual limit of their persistence.

On the 22nd and 25th February 1903, *Shamsher* was allowed to cover mare I. No sores or abrasions existed on the genital organs. The ejaculated fluid presented the characteristic of water, and when the fluid was submitted to microscopical examination it was found to contain a few epethelial cells, spermatozoa and the trypanosoma being absent therefrom on both occasions. At a later date in March, the animal was tried with a mare, but was unable to cover. The œdematous swelling of the sheath and scrotum of the animal, which was marked on its arrival in Bareilly, increased considerably in dimensions during the early days of March 1903, when it attained its maximum proportions. The tissues then appeared to be on the point of giving way under pressure of the contained œdematous fluid. It gradually, however, decreased in size and later the infiltrated tissues became organized.

The scrotal wounds continued to suppurate and heal again under treatment at intervals of six weeks to two months, until about the end of August 1903. Since that date all inflammatory symptoms complicating the scrotum and sheath have subsided.

The external inguinal glands which were enlarged in October 1902 gradually decreased in size, and in the following June could not be felt on manipulation. During the last few weeks of 1902 and the first three months of 1904 several of the joints became affected, were the seat of swelling and somewhat painful to the touch, but the symptoms subsided on each occasion after a few days' duration. On the 12th December 1902 swelling and œdema made its appearance on the under-surface of the abdomen, spreading forward, as in other animals, after increasing and diminishing in amount alternately, and occupying varying periods in the process; it then disappeared for a term, only to return later, on one or more occasions. On January 31st, 1904, the œdema was still present, having persisted more or less since December 27th, 1903.

The temperature of this animal has been taken and recorded twice daily during a period of fourteen months. The maximum 40 5° C. was noted on the evening of the 2nd March 1903, the morning temperature of the same date being 37·7° C. This rise may have been due to the fact that on this date the animal was cast for the purpose of careful examination, and the opportunity was embraced for collecting some specimens of blood from the existing plaque for experimental purposes The minimum temperature recorded but once was 36·3° C. During prolonged periods, however, the body temperature maintained an almost even course between a minimum morning record of 37° C. and a maximum evening one of 38° C.

SHAMSHER.

TABLE X

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaques after arrival at Bareilly 10th December 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUE.		Dimension of plaque in inches.	REMARKS.
			1ST TIME.		2ND TIME.		1ST	2ND		
			Appearance.	Disappearance.	Appearance.	Disappearance.	Days.	Days.		
		Days	1902	1902.						
1	L. Back (under-saddle).	21	Dec. 30th .						3 0 × 2·0	typical, resembling disc of metal under skin.
2	L. Hind quarter.	40	1903 June 8th .						2·5 diam.	Urticarial.
3	L Hind . .	58	Feb. 5th .	Notes under these headings were only commenced after the arrival of the animal at Muktesar on 13th April 1903.					2·0 ,,	,,
4	L. thigh .	59	,, 6th .						3 75 × 2 28	outer portion raised centre somewhat pitted.
5	R. Hind . .	69	,, 10th .						6 0 × 3·0	Long ovoid urticarial.
6	R. Shoulder .	76	,, 23rd .						2·5 diam.	Pitted in centre.
7	R. Hind . .	82	March 1st .						3 0 ,,	Urticarial.
8	R. Hind . .	90	,, 9th						2 0 × 1·0	Kidney-shaped.
9	R. ribs . .	90	,, 9th						2·0 × 1·5	Pitted in centre, raised circumference.
10	R. shoulder .	137	Apl. 25th .	May 4th	...	.	9	...	1 0 diam.	Urticarial.
11	R. shoulder .	137	,, 25th .	Apl. 30th	...	...	5	.	2·5 ,,	,,
12	R. flank . .	180	June 7th .	June 25th	...	...	18		3·5 × 2·5	,, (11th) increased.
13	R. ribs . .	208	July 5th .	July 15th	...	...	10	..	1·0 diam.	,,
14	L. stifle . .	238	Augt. 4th .	Augt. 10th	...	...	6	...	5 0 ,,	,,
15	L. thigh . .	255	Sept. 12th .	Sept. 26th	...	...	14	...	2·0 ,,	Pitted in centre.
16	Inter-maxillary space R.	271	,, 28th	Oct 10th	...	...	12	...	8·0 × 5·0	Oval in form, firm.
17	Both thighs across perineum.	272	,, 29th .	,, 5th	...	...	6	...	6·0 × 3 0	,, urticarial.
18	L. abdomen .	353	Dec. 18th .	1904. Jany. 2nd	...	...	15	...	1 5 diam.	Pitted in centre.
19	R. abdomen .	377	1904 Jan. 12th .	Feb. 6th	...	...	26	...	2·5 × 0·5	Semi-circular.

KILNGARTH.

Spontaneous or Naturally acquired Dourine.

* *Previous History.*—Kilngarth, No. 2877, a brown, thorough-bred English stallion 15-1½ hands, 14 years old, belonging to the Civil Veterinary Department, North Punjab, by *St. Honorat-Lady Radiant*, landed from England in 1893 was sent to the Punjab Veterinary College with the following history. He has been in charge of the 18th Bengal Lancers during 1899-1902 up to the date of his despatch. In 1901-02 he stood at Dera Ismail Khan. The first two years he was with the 18th Bengal Lancers, he stood at Sialkote and this winter at their farm, six miles from Toba Tek Singh, in the Jhang district. During the above period he covered most of the mares of the 18th and several of the 15th Bengal Lancers, besides a fair number of zemindars' and breeders' mares.

Early in January 1903 a report was received from the Veterinary Assistant in the Jhang district that the horse was still suffering from a swollen sheath which he pronounced to be due to syphilis, though he does not mention any discharge or that there were any ulcers present. About a month after the swelling was noticed, the horse had fever for three days, the temperature rising to 105°F. The horse was treated for a time and reported cured, the swellings having disappeared.

The Superintendent examined the horse on the 6th February 1903, just two months after he was reported ill, then the horse looked thoroughly well and in excellent condition. The animal was then sent to Rawalpindi on the 11th February to be placed under observation. Some days later Mr. Trydell examined him again, and was shown a flat circular-shaped swelling, rather larger than a rupee, on skin over the ribs, he was a bit tucked up, and there was apparent swelling of the sheath, but was feeding well and his coat looked bright enough.

The stallion arrived in the Hospital of the Punjab Veterinary College on the 20th February 1903, and was then in good condition. The sheath was noticed to be swollen, the end of the penis œdematous, the meatus everted and red. There were no sores on the penis nor was there any appreciable discharge from the urethra. The temperature was normal, appetite good, and action free. There were no typical patches on the skin, but traces of recent patches could be seen on the quarters.

As the horse had been under observation whilst at Mirpur for nearly three months from 30th July 1901 and no sign of œdema of sheath and penis nor patches on the skin had been noticed during that time or previously, it appears pretty certain that if he were suffering from Dourine, as Mr. Trydell suspected, he was infected after leaving that stand for the 18th Bengal Lancers Stud on the 2nd October 1902. The syce mentioned and described patches on the skin.

Major Pease later visited the stud farm of the 18th Bengal Lancers at Toba Tek Sing and especially directed his attention to those mares which had been covered by *Kilngarth* since his arrival there on 2nd October 1902. He found one, No. 1130, stud No. 50, which he considered diseased. The animal showed the remains of numerous large old Dourine patches on the skin over the ribs and quarters as well as of the neck. The vaginal mucous-membrane presented numerous patches of congestion and was thickened in patches. This mare had been covered by *Kilngarth* on the 10th December 1902.

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* These notes with regard to previous history are taken from Major Pease's report on Dourine.

Between the arrival of this horse at Lahore on the 20th February and 29th March 1903, on which latter date the animal was despatched to the Imperial Bacteriological Laboratory at Bareilly, Major Pease observed the eruption of some 11 patches on various parts of the body, and repeatedly demonstrated the presence of the trypanosoma in the blood drawn from one or other of the patches, and in addition conducted numerous experiments with a view to elucidate further points with regard to the etiology of the disease.

The following notes bear on the symptoms exhibited since the arrival of the animal at the Imperial Bacteriological Laboratory on March 31st, 1903, when the same symptoms as those exhibited on its arrival in Lahore were observed, with one exception that no signs of any old plaques were visible.

In the notes previously put forward it is stated that a plaque was observed by Mr. Trydell between the 6th and 20th February 1903, and Major Pease has enumerated some 11 plaques during the animal's sojourn in Lahore. If we consider that *Kilngarth* contracted Dourine from mare No. 1150 on the 10th December 1902, and fix subsequent symptoms as having appeared so many days after that covering, then the first plaque mentioned as having been observed appeared between the 11th and 20th February 1903, and consequently occurred between the 63rd and 72nd day after covering unless a previous eruption of plaques had occurred, for it is recorded that "the syce mentioned and described patches on the skin," but no dates were given.

Plaques.—On April 3rd, 1903, the fourth morning after the animal's arrival at Bareilly, the 114th day according to the above-mentioned mode of reckoning, a small plaque was noticed on the L. ribs and between the latter date and December 25th, 1903, the 380th day, 41 plaques appeared in all, some few dotted over the body, but for the most part invading both sides of the neck, in fact out of the 41 observed 30 were situated upon the sides of the neck and crest.

Glands.—The submaxillary glands have remained in a normal condition during the period of observation, and the same may be said with regard to the superficial inguinal. A scrotal abscess was observed shortly after the animal's arrival at Muktesar in April which required opening and attention, and subsequently in September and October other small abscesses formed and suppurated, but healed finally.

The testes on external manipulation have always appeared to be smaller than the normal size, and retracted, so that the cord could not be examined. In January 1904, both organs were found to be hard, somewhat atrophic and adherent anteriorly. There was no thickening of the scrotum posteriorly, but the m.m. continued to protrude slightly from the *meatus urinarius*, in somewhat globular form and was pink in colour.

Just as the labia pudendi are seen to augment and diminish alternately or one side only may be swollen (thus giving the organ a deformed appearance), so the œdemata behaved which involved the sheath, scrotum and under-surface of the abdomen of this animal. At first œdema would appear in a part, increase, then gradually decrease and finally disappear, leaving no trace behind, occupying some 8 or 9 days. After a repetition on several occasions, a certain amount of thickening was left which was not absorbed before a fresh infiltration took place, especially after an increase of the local temperature had been present. This see-saw in the amount of swelling and œdema present in the affected structures has been a constant feature not only in the course of *Kilngarth's* case, but in most other of the Dourine-affected animals which have passed through our hands.

No disseminated urticarial eruption was noted in this case, which in several of the animals was such a marked feature, but a vesicular form of eruption appeared in November 1903 implicating more or less the skin of the whole body; it gradually increased in amount from the 17th to the 21st of the month, remained stationary until the 24th, then commenced to fade, finally disappearing on December 1st, leaving small scars on each spot invaded. Twenty-four hours after their appearance, the vesicles burst and discharged a clear, glairy, and albuminous straw-coloured material having the consistency of white of egg, but no trypanosomata were discovered in the collected fluid submitted to microscopical examination. Up to the time of writing, this animal's temperature has been recorded twice daily for a period of ten months, during which time it has seldom varied from a minimum of 36·6° A.M. and a maximum of 38·0° C. P.M. On three occasions evening temperatures of 38·6, 38·7, and 38·8 have been noted, and in each instance on the following morning a considerable increase in the œdema involving the scrotum and under-surface of the abdomen was observed to have taken place, which might account for the rise. The maximum temperature recorded was 39·6° C. and this was registered at Bareilly on the evening of the animal's arrival from Muktesar, after a march of ten miles a day for three days in succession. There is no weakness evinced when pressure is made over the loins, and no lameness observable at the walk or when the animal is exercised at the trot. The œdema of the sheath has now become organized, the tissues of the anterior portion of the scrotum are slightly thickened and there is slight œdema on the under-surface of the abdomen in front of the sheath.

TABLE XI

Showing the number of plaques which appeared after the animal's arrival at the Imperial Bacteriological Laboratory, their situation, dates of appearance, and disappearance together with the duration, etc., of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after covering mare No 1150, Dec. 10th 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.						DURATION OF PLAQUES.			Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		THIRD TIME.		1st	2nd	3rd		
			Appeared.	Disappeared	Appeared	Disappeared.	Appeared	Disappeared.	Days.	Days.	Days.		
1	L. ribs	Days. 114	1903 April 3rd	1903. Apl. 6th	1903. May 10th	1903. May 14th	1903. ..	1903. ...	3	4	...	0·5 diam.	Urticarial.
2	L. neck	116	,, 5th	,, 9th	...	...	..	...	4	...	...	0·5 ,,	,,
3	L. shoulder	117	,, 6th	,, 7th	...	...	...	...	1	...	...	0·5 ,,	Urticarial 8 A.M., disappearing noon.
4	R. neck	127	,, 16th	,, 23rd	...	...	...	..	7	...	...	2·0 × 1·0	Kidney-shaped, (19th) increased in size.
5	R. neck	127	,, 16th	,, 27th	...	...	...	...	7	...	...	2·0 × 1·0	Kidney-shaped, (19th) increased, (20th circular, pitted in centre).
6	R. neck	127	,, 16th	,, 25th	...	...	...	...	9	...	...	1·0 diam.	Pitted in centre.
7	L. ribs	128	,, 17th	,, 18th	...	...	...	..	1	...	...	1·0 ,,	Urticarial.
8	L. neck	133	,, 22nd	June 7th	...	...	...	...	46	...	...	1·5 ,,	,,
9	R. neck	137	,, 26th	May 2nd	...	...	...	...	6	...	...	1·0 ,,	,,
10	R. neck	137	,, 26th	Apl. 30th	...	...	...	...	4	...	...	1·0 ,,	,,

TABLE XI—*contd.*

Showing the number of plaques which appeared after the animal's arrival at the Imperial Bacteriological Laboratory, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after covering mare No 1150, Dec. 10th 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.						DURATION OF PLAQUES.			Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		THIRD TIME.		1st	2nd	3rd		
			Appeared.	Dis-appeared.	Appeared	Dis-appeared.	Appeared.	Dis-appeared.	Days.	Days.	Days.		
		Days.	1903.	1903	1903.	1903.	1903.	1903.					
11	R. neck	144	May 3rd	May 9th	...	...		...	6	...	...	3·0 diam.	Urticarial, enclosing Nos. 9 and 10.
12	R. flank	162	„ 21st	June 5th	...	...	...	...	15	...	...	0·75 „	Urticarial, (28th) 1·25 diam.
13	R. neck	164	„ 23rd	„ 4th	...	..	...	...	12	...	...	1·25 „	Urticarial.
14	R. neck	164	„ 23rd	May 28th	...	...	...	...	5	...	...	2·0 × 1·5	Kidney-shaped.
15	R. buttock	166	„ 25th	„ 28th	...	...	...	...	3	...	...	1·25 × 0·5	Kidney-shaped, urticarial.
16	R. neck	167	„ 26th	June 4th	...	...	...	...	9	...	...	1·25 × 0·	Kidney-shaped, urticarial.
17	R. ribs	169	„ 28th	„ 4th	...	...	..	...	7	...	...	1·0 × 0·5	Urticarial.
18	L. neck	190	June 18th	„ 29th	July 5th	July 15th	...	...	11	10	...	2·5 × 1·0	Kidney-shaped, urticarial. (19th) increased and two became fused. July 20th 4·02 × 2·5 kidney-shaped.

19	L. neck	190	,, 18th	,, 29th	,, 5th	,, 30th	Aug. 3rd	Aug. 17th	11	25	14	2·5 × 1·0	Kidney-shaped, urticarial.	July 30th only small lump remains. Aug. 3rd 2·5 × 1·0.
20	L. neck	194	,, 22nd	July 8th	...	...	...	...	16	...	...	1·0 × 0·5	Urticarial.	Aug. 26th 2·5 × 1·5 July 1st 4·0 × 2·5.
21	R. neck	203	July 1st	,, 4th	July 8th	July 24th	...	...	3	16	...	1·75 diam.	Pitted in centre.	
22	R. neck	203	,, 1st	,, 24th	...	...	...	...	23	...	...	1·75 × 1·5	Urticarial.	
23	R. neck	207	,, 5th	,, 8th	July 14th	July 30th	...	...	3	16	..	3·0 × 2·5	,,	
24	L. neck	216	,, 14th	Aug. 3rd	...	...	...	...	20	...	...	0·5 diam.	Urticarial, (20th) 3·0 × 1·0.	
25	L. hip	222	,, 20th	,, 3rd	...	...	...	...	14	...	...	1·5 × 1·0	Semilunar, (27th) 2·0 diam.	
26	R. flank	226	,, 24th	,, 25th	...	...	...	...	1	...	...	0·5 × 0·25	Urticarial.	
27	L. neck	241	Aug. 8th	Sep. 6th	Sep. 8th	Oct. 10th	Oct. 11th	Dec. 12th	29	32	62	1·5 diam.	Urticarial, (18th) 2·5 × 2·0, *vide* No. 35.	
28	R. neck	244	,, 11th	,, 29th	...	...	...	...	18	...	...	1·5 ,,	Urticarial, (Sept. 17th) pitted in centre.	
29	R. neck	246	,, 13th	Oct. 9th	...	...	...	...	57	...	...	1·75 × 1·5	Urticarial, (Aug. 27th) pitted in centre.	
30	L. neck	272	Sep. 8th	Sep. 30th	...	...	...	...	22	...	...	1·5 diam.	Urticarial, spread over crest.	
31	R. thigh	280	,, 16th	,, 22nd	...	...	...	...	6	...	...	2·5 × 0·5	Eliptical, urticarial.	
32	R. neck	306	Oct. 12th	Nov. 2nd	...	...	...	...	21	...	...	1·5 × 0·5	Urticarial, (16th) kidney-shaped, pitted, upper half disappeared, lower half increased.	

TABLE XI—*contd.*

Showing the number of plaques which appeared after the animal's arrival at the Imperial Bacteriological Laboratory, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after covering mare No 1150. Dec. 10th, 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.						DURATION OF PLAQUES.			Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		THIRD TIME.		1s	2nd	3rd		
			Appeared.	Dis-appeared.	Appeared	Dis-appeared.	Appeared.	Dis-appeared.	Days.	Days.	Days.		
		Days.	1903.	1903	1903.	1903.	1903.	1903.					
33	L. neck	306	Oct. 12th	Nov. 16th	...	...	...	...	35	...	...	3·5 × 2·5	Urticarial.
34	L. stifle	...	„ 12th	Oct. 26th	...	...	...	...	14	...	...	2·0 × 1·0	„ kidney-shaped.
35	L. neck	309	„ 15th	Dec. 9th	...	...	...	...	55	...	...	2·0 diam.	(27th) joined with No. 278·5 × 2·0 spread over the crest.
36	L. neck	311	„ 17th	Oct. 24th	...	...	...	...	7	...	...	4·0 × 1·5	Urticarial.
37	R. neck	331	Nov. 6th	Nov. 27th	...	...	...	...	21	...	...	3·25 diam.	Urticarial, (15th) kidney-shaped.
38	L. abdomen	348	„ 23rd	Dec. 14th	...	...	...	...	11	...	...	1·0 × 0·5	Oval, urticarial.
39	R. neck	366	Dec. 11th										
(*a*)	...	...	...	1904. Jan. 6th	...	...	...	...	26	...	...	× 1·5	Urticarial, pitted in centre, plaque No. 39, at first single divided into two parts (*a*) upper, (*b*) lower, later they developed separately.

(b)	...	...	...	Jan. 2nd	...	...	...	...	22	...	...	2·25 × 1·5	Kidney-shaped, urticarial.
40	R. neck	377	„ 22nd	„ 6th	...	...	...	...	15	...	...	2·5 × 1·0	Kidney-shaped, urticarial,
41	R. neck	380	„ 25th	„ 9th	...	...	...	...	15	...	...	2·0 × 0·75	Kidney-shaped, urticarial.
42	Both sides neck	456	1904 Mar. 10th	Mar. 21st	...	...	...	...	11	...	...	3·0 × 1·5	Pitted in centre.
43 *	L. chest	470	Apl. 2nd	?	...	...	..	...	..	...	...	2·0 × 1·5	Urticarial.

* Eleven additional plaques appeared between 2nd April and animal's death in September 1904 (*vide* Summary).

YADGIR.

LATENT FORM OF DOURINE.

At a later date active symptoms supervened.

A chestnut Arab (No. 2348), 14-3¼, age 14 years, Sire *Anaiza*, Dame *Hadban*, Civil Veterinary Department stallion was landed in Bombay, 2nd November 1892. The following are the names of the stands with the dates where the stallion has been stationed :—

Basatikri	.	31st August 1893.	Depôt	18th December 1894.
Yousaffa	.	28th January 1895.	Depôt	3rd April 1900.
Etah	.	28th April 1900.	Depôt	1st August 1901.
Nourangabad		4th October 1901.	Depôt	9th March 1902.
Masauta	.	10th March 1902.	Depôt	7th September 1902.
Jarki	.	4th December 1902.	Depôt	26th March 1903.
(B. W. 902 lbs.)		.	.	(B. W. 845 lbs.)
Bareilly	.	29th March 1903.		
Muktesar	.	10th April 1903.		
Bareilly	.	11th November 1903.		

Previous History.—Very little was seen of this horse at the Depôt, as Arabs are not regularly brought in for summer rest like the English stallions. On account of swelling of sheath and scrotum which was reported in August, the animal was ordered in from Masauta for rest and treatment and arrived in September 1902. No other symptoms were observed, but those above mentioned, as for instance loss of condition, œdema of the hind limbs and patches on the skin, etc. The animal was treated with Arsenic and Nux Vomica and having considerably improved in condition was returned to his stand at Jarki on the 4th December 1902. Body weight 902 lbs. On orders being issued for his removal to the depôt as a suspected case of Dourine, the horse arrived looking pulled down, body weight 845 lbs., his sheath and scrotum very much larger, than it ever was before. Up to the date of his being despatched to Bareilly, 29th March 1903, no circular patches on the skin or any other marked symptoms had been observed.

The animal was received at Bareilly Laboratory on 31st March 1903. On examination, with the exception of marked enlargement of the sheath and slight thickening of the tissues of the scrotum, no other symptoms of Dourine were noted.

Between the 31st March and April 10th, on which latter date the animal was removed to the Muktesar Laboratory in the Hills, the first small plaques, 2 in number, urticarial in form and character and soft in consistency, made their appearance on April 3rd.

A third plaque made its appearance on the 17th April, a few days after the exertion caused by marching a distance of 30 miles up to the Muktesar Laboratory at an elevation of 7,500 feet.

An interval of 28 days now occurred before the eruption of the 4th, and one of 48 days between that of the 4th and 5th plaques, but during the months of July-October inclusive some 27 cutaneous patches were noted.

Between 25th October and December 18th, an interval of 54 days, no further were seen, but within the next month five plaques appeared on the sides of the abdomen and R. flanks.

Several mares were covered by this stallion during the first half of May 1903; Mare II on May 8th, and Mare V (three coverings) between the 11th and 15th. The semen on each occasion was found to contain numerous spermatozoa, but no mature trypanosomata were ever discovered in the numerous fresh specimens submitted to microscopical examination.

The following details with regard to the most important symptoms noted during the course of the case have been collated for the sake of brevity.

May 8th, 1902. An ulcer on the anterior surface at the root of the free portion of the penis was observed by the Veterinary Assistant when mare II was covered. It persisted for some days and finally healed on May 20th. No trypanosomata were observed in specimens of scrapings from the ulcer submitted to examination. (Photo IX.)

On the 29th June 1903, a somewhat thick muscular fold or ring was observed to have been formed by the sheath at the root of the penis, this had a tendency to produce phymosis, but gradually disappeared without producing severe symptoms. About the same date the external inguinal glands became somewhat enlarged and that on the left side was felt to be hard on palpation. These conditions persisted for several months, but on the 12th January 1904 the glands were normal in size and consistency. The submaxillary glands, however, were not observed to be involved at any time during the course of the case.

The teste which previous to the middle of July had remained perfectly healthy, as far as external manipulation could decide, then became hard and the right organ more so than the left. Six months later they appeared to have become irregular in shape and were then harder than normal.

In addition to the cutaneous plaques observed from time to time which are usually well defined and isolated, other forms of eruptions were noted. On the 15th July 1903, a vesicular form of eruption appeared on the head, neck and shoulders, which after 24 hours discharged a clear, glairy and sticky straw coloured fluid, which caused the hair in close proximity to become matted; this form only persisted for 48 hours and then disappeared. In this fluid no trypanosomata could be found. A second form, the true disseminated urticarial, appeared on three different occasions. Both sides of the neck were thickly invaded on the 28th August, but the eruption had entirely disappeared after a period of 30 hours. On the second occasion, 19th September, both sides of the body and abdomen were implicated, this eruption attained a maximum on the evening of the 20th, persisted during the 21st to 24th inclusive and finally disappeared on the 25th September. On the third occasion, October 10th, the right and left shoulders were the seat of the disseminated urticaria more or less confluent in patches, the size of a man's hand but evanescent in character, for in a few hours it commenced to fade, and after 24 from the onset no sign was left.

The œdema of the sheath and scrotal tissues, the first symptom in August 1902, which drew attention to the probable cause of the disease, remained more or less stationary for some 8 months, but after the animal had been used for the purpose of covering, symptoms increased in severity.

The œdema of the sheath augmented and decreased from time to time during a period of months; at first the swelling was found to be hot and tender on manipulation, but later these symptoms were absent. At one time the swelling and œdema of the parts would be uniform and bilateral, while on another occasion after reduction and absorption of the œdema and subsequent period of rest, it would be followed by a unilateral swelling of the sheath, which once persisted for a period of 12 days and then diminished in size.

One other symptom which has to be noted occurred on the 3rd December 1903, *viz.*, swelling of the left hock accompanied by effusion of fluid into the joint. This condition was maintained for some days but finally disappeared on the 22nd December.

During a period of 300 days, the temperature, pulse, and respiration of this animal have been taken morning and evening, and only on very few occasions have the readings been anything in excess of the normal limits of 37·2° to 38·3° C. On such occasions only a slight exacerbation of the temperature would be recorded on the previous evening with a normal temperature on the following morning. The evening before the appearance of a plaque, a rise of a degree has been registered on three occasions, and one morning when a fresh plaque in addition to considerable œdema on the under-surface of the abdomen had made its appearance, the temperature of the previous evening was as high as 40° C.

It is impossible to form an exact opinion as to the date on which this stallion contracted the disease, as no records are forthcoming on the subject. It is more than probable, however, that it must have been a date between its arrival at Masauta on the 10th March, and removal to the depôt on 7th September 1902. The swelling of the sheath and scrotum was therefore the only outward and visible manifestation present during the period of eight months, August to March 29th, previous to the animal's despatch to Bareilly. As the first plaques made their appearance three days after the animal's arrival at the latter Laboratory, it would seem likely that the railway journey, March 29th to 31st, at 5 P.M., during which *Yadgir* was much shaken and had but little rest, acted as an exciting cause in lighting up the disease.

If we locate the first symptom noted, *viz.*, the swelling of the sheath, as having commenced during the middle (15th) of August 1902, it will be found that the first plaque only appeared 232 days later and that 36 in all had made their appearance during a period of 522 days.

YADGIR.

TABLE XII

Showing the number of plaques, their situation, dates of appearance and disappearance together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after first symptoms of swelling of sheath August 15th, 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUES.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		1ST	2ND.		
			Appearance.	Disappearance.	Appearance.	Disappearance.	Days.	Days.		
			1903.	1903.	1903	1903.				
1	R. ribs .	232	Apl. 3rd	Apl. 8th	...	...	5	...	0·5 diam.	Urticarial.
2	R. stifle .	235	„ 6th	„ 9th	...	...	3	...	0·75 „	„
3	L. ribs .	246	„ 17th	„ 27th	...	...	10	.	0·5 „	Urticarial, (19th) increasing, (24th) 2·0 diam.
4	L. ribs .	269	May 10th	June 4th	...	..	24	.	2·0 × 1·0	Kidney-shaped: urticarial, (14th) increased in size.
5	R. ribs .	317	June 27th	July 12th	...	...	15	..	2·0 diam.	Urticarial, (29th) pitted in centre, July 4th 4·5 diam.
	Neck, face and shoulders.		July 15th	„ 26th	...	...	11	...	... ..	Vesicular eruption after 24 hours, discharging clear sticky straw coloured fluid.
6	L. ribs .	331	„ 11th	„ 22nd	...	...	11	..	1·0 × 0·5	Urticarial, (12th) kidney-shaped, (18th) 1·5 diam.
7	R. ribs .	331	„ 11th	„ 24th	...	...	13	...	2·25 diam.	Pitted in centre, (15th) 4·0×3·25, (17th) 4·5 × 4·0, (18th) 5 × 4.
8	R. flank .	331	„ 11th	„ 20th	...	...	9	..	3·0 × 2·5	Semi-lunar, urticarial.
9	L. abdomen	335	„ 15th	„ 22nd	July 26th	July 30th	7	4	4·0 diam.	Urticarial.
10	L. ribs .	337	„ 17th	„ 26th	...	..	9	...	1·25 „	„
11	L. ribs .	343	„ 23rd	Aug. 14th	...	...	22	...	1·5 × 0·75	Urticarial, (27th) 3·0 × 1·75.
12	R. thigh .	353	Aug. 2nd	„ 8th	Aug. 9th	Aug 13th	6	4	4·0 diam.	Urticarial, (3rd) 5·0 × 4·0, (5th) pitted at edge, (8th) lower-half disappeared.
13	L. thigh .	355	„ 4th	„ 15th	...	...	11	...	2·0 × 1·5	Urticarial, (9th) 3·0 × 1·5, kidney-shaped.
14	R. shoulder	355	„ 4th	„ 30th	...	...	26	...	0·5 diam.	Urticarial, (8th) increased in size.
15	L. wither .	360	„ 9th	„ 14th	...	...	5	...	1·25 × 0·25	Kidney-shaped, urticarial, (12th) 2·5 diam.
16	R. thigh .	378	„ 27th	Sep. 2nd	...	...	6	...	1·0 diam.	Urticarial, (29th) 2·5 diam.
	Both sides neck.	379	„ 28th	Aug. 29th	...	...	1	...		Disseminated, urticarial rash.
17	L. abdomen	380	„ 29th	„ 7th	...	...	9	...	1·5 „	Pitted in centre, (1st) more prominent.
	On Body .	391	Sep. 19th	Sep. 25th	...	...	6	...		Disseminated, urticarial rash.
18	R. abdomen	407	„ 25th	Oct. 15th	...	...	20	...	1·5 „	Urticarial.

TABLE XII—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each, respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after first symptoms of swelling of sheath, August 15th, 1902.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUES.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		1ST.	2ND.		
			Appearance.	Disappearance.	Appearance.	Disappearance.	Days.	Days.		
			1903.	1903.	1903.	1903.				
19	R. iliac region.	412	Sep. 30th	Oct. 12th	Oct. 10th	Oct. 12th	12	2	2 0 diam.	Urticarial.
20	L. chest .	413	Oct. 1st	„ 11th	...	...	10	...	2·5 „	„
21	L. abdomen	413	„ 1st	„ 11th	...	...	10	...	2 5 × 1·5	„
22	R. crest .	419	„ 7th	„ 21st	...	...	14	...	2·0 diam.	„
23	R. abdomen	419	„ 7th	„ 14th	...	...	7	...	3·0 × 2·0	„
24	R. flank .	419	„ 7th	„ 28th	...	...	21	...	3·0 × 1·0	„
25	R. flank .	422	„ 10th	„ 25th	...	...	15	...	3·0 × 2·5	„
26	R. abdomen	422	„ 10th	„ 25th	...	...	15	...	2·0 diam.	„
27	L. abdomen	422	„ 10th	„ 25th	...	...	15	...	2·0 „	Urticarial, (16 and 17) increased in size.
	R. and L. shoulders.	422	„ 10th	„ 11th	...	...	1	..	...	Disseminated urticarial rash.
28	R. chest ...	423	„ 11th	„ 24th	...	...	13	...	4·0 × 0·5.	Urticarial.
29	L. crest .	425	„ 13th	„ 20th	...	...	7	...	2·0 diam.	„
30	L. thigh .	428	„ 16th	Nov. 7th	...	...	22	...	1·25 × 0·5	Urticarial, (30th) increased in size.
31	R. flank .	437	„ 25th	„ 14th	...	...	20	...	2·25 × 1·0	Kidney-shaped, urticarial.
				1904.						
32	R. abdomen	491	Dec. 18th	Jan. 4th	...	...	17	...	2 5 diam.	Pitted in centre, (21st) 3·0 × 1·5, (25th) 4 0 diam., (28th) increased.
33	L. abdomen	495	„ 22nd	„ 3rd	...	...	12	...	3·0 × 2·25	Kidney-shaped, urticarial.
34	R. flank.	496	„ 23rd	„ 1st	...	...	9	...	2·0 × 1·0	
			1904.							„ „
35	R. abdomen	508	Jan. 4th	„ 11th	...	...	7	...	2·5 × 1 0	„ „
36	L. abdomen	522	„ 18th	„ 27th	...	...	9	...	2·0 × 1·25	„ „
37	R. thigh .	531	„ 27th	Feb. 2nd	...	...	6	...	3 5 × 2·0	„ „
38	L. ribs .	536	Feb. 1st	„ 23rd	...	...	22	...	2·0 × 1·0	Kidney-shaped, 6th became circular, urticarial 7th increased.
39	L. root tail	574	Mar. 9th	Mar. 17th	...	...	8	...	3·0 × 1·5	
40 *	L. flank .	590	„ 21st	...	...	...	...	...	1·5 diam.	Pitted. 8th again kidney-shaped.

* Up to October 18th, eleven fresh plaques have appeared,

VENDOR.

Horse used for stud purposes in the district. Received at Depôt for summer rest (July 1901), suffering from debility, loss of weight, enlargement of scrotum and sheath, swelling of hind limbs. Treatment, Iodide of Iron and Nux Vomica, regular exercise. Apparent recovery. Used for stud purposes from October 1901 to July 1902. On return to depôt presented symptoms of advanced Dourine. Treatment, Mercuric Perchloride and Potassium Iodide. General improvement and recovery conjectured, showed no symptoms of ill-health during period of 10 months. June 1903 covered mare suffering from Dourine, followed 18 days later by eruption of cutaneous plaque (trypanosoma) and during 12 weeks, by 17 further plaques together with disseminated urticaria. Œdema of throat extending to chest, weakness and later, loss of power over hind quarters, hæmoglobinuria and death.

A thorough-bred Australian horse, aged, received from Babugarh Remount Depôt on the 31st March 1903, with the following history :—

1st July 1901.—This animal was received in this Depôt for summer rest and it was then observed that it had not only lost considerably in weight and looked bony but had a distinct enlargement of the scrotum and sheath and that the hind limbs were swollen. The treatment adopted was brisk purgative followed by internal administration of Iodide of Iron and Nux Vomica in the form of a bolus, regular exercise, which, if neglected, caused the animal's extremities to swell more, so that exercise reduced the swelling of the sheath, and the scrotum appeared smaller. In October 1901 the animal was again sent out to the district and no more was heard of it until 1st July 1902. This time a further reduction in condition was observed and the animal showed apparent weakness about the loins, the sheath and scrotum were more enlarged, but the swelling of the hind limbs was less. Further, there was an eruption of circular patches at intervals. The animal was then treated with Liquor Arsenicalis and Tinctura Nucis Vomicæ, but finding no decided change for the better under this course, the following was substituted, *viz.*, Liquor Hyd. Perchlor. Potass Chlr. and Potass Iodide in the form of a drench This seemed to have had the effect of checking the eruption of circular patches, as no fresh ones appeared; the horse fed well, showed no symptom of ill health and gained considerably in weight by October 1st, 1902. Between this latter date and March 31st, 1903, the only symptom visible was some thickening of the sheath and scrotum. On April 10th the animal was removed up to the Muktesar Laboratory (elevation 7,500 ft.) and from the date of its arrival until June 23rd, there was not a degree difference between the morning and evening rectal temperature, which only varied between 37° and 38° C. On this latter date and on several occasions within the next few days, the animal was allowed to cover mare No. 1 in order to observe whether *Vendor* was susceptible to the disease, for although no trypanosomata had ever been discovered in the vaginal secretion, nevertheless a number of unmistakable plaques had appeared on the cutaneous surface of the body of the mare.

June 30th.—Considerable swelling and œdema of the sheath occurred which later developed into a paraphymosis which was only partially reduced by

repeated scarification. Suppuration followed and considerable swelling of the parts existed until the time of death, 12th October 1903.

On the evening of the 10th July, 18 days after serving mare 1 on the first occasion, the temperature which was 37·6° C. in the morning rose in the evening to 39·1 C., and on the following morning a plaque was observed on the left side of the body involving the skin over the ribs; from this date until the 4th October 1903, some 18 plaques, made their appearance on different parts of the body, at intervals; and on several occasions there were also localized eruptions of urticaria which persisted for several days and then faded. On another occasion, 9th September, an œdematous swelling was noted involving the subcutaneous tissues in front of the trachea, from the lower edge of the thyroid cartillage and extending down on the front of the chest, this persisted for a period of three days and then became absorbed, no dyspnœa developed as a consequence.

On the morning of the 7th October, the animal was found to show marked symptoms of weakness in the hind quarters and on the next day was unable to stand, but 24 hours later, with assistance was raised and able to maintain the standing position, but with some difficulty. At this time the œdematous swelling extended upwards towards the perinæum, and hæmoglobinuria appeared, later the R. hind extremity became swollen and œdematous swelling appeared on the left side of the neck, and the tissues surrounding the anus became infiltrated and œdematous. At this period the animal was off feed, and unable to rise from its bed.

On the morning on which death occurred plaque No. 16 reappeared on the left side of the crest.

Autopsy—Three hours after death :—

On removal of the skin, examination of the seat of No. 16 plaque revealed the presence of a very thin layer of gelatinous material lying in the subcutaneous tissues. The latter presents a variety of colouring, being stained in different portions of the area invaded by plaque in shades of yellow, green, and red, the surrounding tissues presenting a normal appearance. On opening the chest, the pleural cavities were found to contain 1,500 c.c. of blood-stained fluid, free from flocculi.

***Lungs.*—Weight 15 lbs. emphysematous, tissues congested but not petechiated. *Pericardial sac* contains 800 c.c. of blood stained fluid. *Heart* weighs 10 lbs. 3 ozs.; enlarged external surface presents healthy appearance. *On section* walls of left ventricle hypertrophied, no subendocardial extravasations, firm blood clots in both the ventricles. *Peritoneal cavity* free from fluid. *Liver* weighs 17 lbs, enlarged. *On section* tissues dark, yellowish-red in colour and soft. *Spleen* weighs 6 lbs. much enlarged, nearly three times normal size. *On section* tissues dark, nearly black in colour and pulpy. *Kidneys,*—R. 3 lbs. 7 ozs., L. 3 lbs., considerably enlarged. *On section* tissues pale and hilum of each organ occupied by semigelatinous material. *Stomach*, normal in appearance. *Small intestines.*—*On section* m. m. vessels injected. *Large intestines* m. m. congested. *Bladder*, urine contains colouring matter of blood but no red blood corpuscles, on microscopical examination, m. m. somewhat congested.**

Spinal membranes.—*On section* the membranes contain a small quantity of a slightly opalescent fluid in which no mature trypanosomata could be discovered. Spinal cord, capillary vessels on the surface are injected with dark coloured blood. The external surface of the cord is pale in colour and shows no petechiæ or extravasations. *On section,* microscopically no changes can be observed anywhere in the posterior dorsal or lumbar portions of the organ, and on microscopical examination of tissue taken from several portions of the cut surface no trypanosomata were discovered.

Genital organs.—There is extensive thickening of the tissues of the sheath and scrotum. The tested atrophied and both organs are fairly adherent by their external surfaces to the surrounding tissues. The spermatic cords are increased in size and their walls thickened.

Trypanosomata found in stained specimens of blood from general circulation at time of death.

VENDOR.

TABLE XIII

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	Date of appearance and disappearance of plaque.		Duration of plaques in days.	Dimensions of plaque in inches.	Remarks.
			Appearance.	Disappearance.			
		Days.	1903.	1903.			
1	L. ribs . .	19	July 11th	July 16th	5	1·5 diam. .	Circular, urticarial.
2	R. thigh .	23	,, 15th	,, 29th	14	2·5 × 1·0 .	Kidney-shaped, urticarial.
...	R. ribs . .	...	,, 31st	Aug. 6th	6	...	Disseminated, urticarial eruption in groups.
3	R. thigh .	48	Aug. 9th	,, 22nd	14	4·0 × 0·5 .	Semi-lunar, urticarial, hard spot in centre.
4	L. side neck .	...	,, 9th	,, 27th	18	2·0 × 0·5 .	Oval, urticarial, (12th) increased to 2·0 × 1·0.
5	L. side abdomen.	75	Sep. 5th	Sept. 12th	7	1·25 diam. .	Circular, pitted in centre, (8th) kidney-shaped 1·5 × 0·5.
6	L. ribs . .	76	,, 6th	,, 8th	2	1·5 ,, .	Circular, urticarial.
...	Trachea .	...	,, 9th	,, 12th	3	..	Swelling and œdema over Trachea running down on the front of chest.
7	R. shoulder .	82	,, 12th	,, 15th	3	2·5 diam. .	Circular, urticarial, (13th) increased to 4·0 × 2·5 inches.
8	R. ribs . .	82	,, 12th	,, 18th	6	1·5 ,, .	Circular, urticarial, (13) increased to 2·0 diam.
9	L. ribs . .	82	,, 12th	,, 18th	6	1·0 ,, .	Circular, urticarial, (13th) increased 2·5 diam.
10	L. spur vein .	83	,, 13th	,, 17th	4	2·0 ,, .	Circular, urticarial.

TABLE XIII—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				Duration of plaques in days.	Dimensions of plaque in inches.	REMARKS.
			Appearance.		Disappearance.				
		Days.	1903.		1903.				
11	L. axilla .	85	Sept.	15th	Sep.	17th	2	1·75×1·0 .	Oval, urticarial.
12	L. shoulder .	87	„	17th	„	19th	2	2·0 diam. .	Circular, urticarial.
13	R. fore-leg .	91	„	21st	„	24th	3	3·0×2·0 .	Oval, urticarial.
14	R. shoulder .	93	„	23rd	„	27th	4	2·5 diam. .	Circular, urticarial. Hard nodule left.
15	R. hip . .	94	„	24th	„	27th	4	1·0×0·5 .	Oval, urticarial. Hard nodule left.
16	L. side crest .	96	„	26th	Oct.	11th	15	2·0 diam. .	(28th) Extended to R. side of crest in corresponding situation.
17	R. side crest .	98	„	28th	„	11th	13	2·0 „ .	Circular, urticarial.
18	L. ribs . .	104	Oct.	4th	„	6th	2	2·0 „ .	Circular, urticarial, nodule left.
...	...	...	„	7th	...		...	...	Animal weak, in hind quarters.
...	...	...	„	8th	...		...	...	Animal weak, unable to rise.
...	...	...	„	9th	...		...	...	Standing with difficulty, weakness more marked.
...	...	...	„	9th	..		..	...	Œdema spreading to perinæum, hæmoglobinuria.
...	...	...	„	10th	...		...	...	Œdema involving tissues round anus.
...	...	...	„	11th	...		...	...	R. hind limb swollen and œdematous.
...	...	...	„	12th	...		...	...	Swelling of L. side of neck. Off feed, unable to rise.
19	L. side crest .	112	„	12th	...		...	...	No. 16 plaque reappeared on L. side of crest.
...	...	...	„	12th	...		...	...	Death 8 P.M. Temp. rectal 38·5 C.

On looking over the notes of this case, it would appear that the animal which had evidently suffered from Dourine during a period of two seasons, had been perfectly cured of the disease, by the administration of Mercury and Potassium Iodide, and that the only visible results of the Malady were the swelling and thickening of the sheath and scrotum; for during a period of ten months the animal was in the best of health and condition. After covering a

Dourine mare on several occasions (trypanosoma never found in vaginal secretion). *Vendor* did not exhibit any primary symptoms of the disease, but 18 days after the first covering, a plaque made its appearance. From direct inoculation of blood containing the trypanosoma, we are in a position to state that the usual period is about 30 to 34 days and that 18 days is too short a period to allow between inoculation of the hæmatozoon and the appearance of the first plaque. We must, therefore, negative the idea that *Vendor* had wholly recovered after treatment and had contracted Dourine a second time, and hold that the trypanosoma remained in the system of the animal perhaps in a mature form only rendered more or less innocuous by the prolonged administration of Mercury and Potassium Iodide,* but more likely in an immature form. It is evident that owing to the reduction in energy brought about from the exertion in serving a mare on several occasions, a loss of power of resistance was produced which allowed of the trypanosomata developing and thriving in blood, which previously had been an unsatisfactory medium and had held it in check.

MONARCH.

A bay Arab stallion, age 5½ years, 14-1½ hands, was received at Babugarh from Bombay, 2nd December 1902, and was cast for Cataract on March 29th 1903.

The horse was received at the Bareilly Laboratory on the 31st March, and a few days later, April 10th, was removed to the Imperial Bacteriological Laboratory, Muktesar.

May 4th, 1903.—The animal was in good health and condition, and since its arrival on April 13th, the morning and evening rectal temperatures have only varied between 37° and 38°C. On the mornings of the 4th, 6th, and 7th May *Monarch* was allowed to cover mare III, the latter animal, as may be seen from the notes of the case, was inoculated on the m. m. of the left labium, with a slight trace of blood drawn from a cutaneous plaque on *Kilngarth*, on April 17th, eighteen days previously. At the time of covering, the mare exhibited but slight symptoms of Dourine, the chief being some swelling of the left labium of vulva and slight œdema of perineum, but there was no vaginal discharge present. The vaginal mucus, however, was found to contain the trypanosoma on microscopical examination.

May 18th.—The first symptoms observed in *Monarch* were a few cracks on the m. m. of the penis, superficial in character, which readily healed within 24 hours of their first appearance. Ten days later marked symptoms of colic appeared, and these subsided within a few hours under appropriate treatment. On June 3rd, thickening of the sheath became manifest for the first time and was followed on the morning of the 6th by the eruption of three well marked cutaneous plaques, two on the left flank and the third on the right side of the abdomen, these were all circular in form, pitted in the centre, varying in size, from 2·5 to 2·0 inches in diameter. The impression conveyed being as if a ring had been sawn in half along the circumference, and one half had been placed under the skin, thus the skin inside of the circle was flat, while the circumference was raised in a semi-circular form. The trypanosoma was discovered in the blood drawn from the centre of the plaques above mentioned, thus confirming the diagnosis of Dourine in *Monarch*. On the 8th June, the œdema previously noted as complicating the sheath only, now spread forward in front of it, along the under-surface of the abdomen. On the several occasions between the 11th and 27th June, this animal covered a healthy country bred cast mare No. VI, and although superficial erosions were observed on the penis, no symptoms of Vesicular Exanthema subsequently followed the union in the mare. The next symptom observed in the stallion was the increase in size of the superficial inguinal glands which occurred on the 22nd June; further observations with regard to this and other symptoms will be added later. Again between the 30th June and 4th July, after the complete disappearance of the erosions implicating the m. m. of the external surface of the penis, *Monarch* covered a second healthy country-bred cast mare No. VII on several occasions, the last being on July 3rd. On the morning of this latter date, 2 small ulcers were observed on the glans-penis and two others on the body of the organ. This last union was followed in the mare within 24 hours by an eruption of vesicles and ulcers on the vaginal m. m. and on the external surface of the vulva, accompanied with a glairy viscid discharge from the passage. As on the following morning, the 5th, the penis of the stallion presented memrous ulcers, somewhat excavated all over the free portion of the organ. Mare No. VIII, which had been brought into season, was put to *Monarch* and served once. As in the case of mare VII, only in this instance, after 48 hours, an eruption appeared on the vaginal m. m. and later the external surface of the vulva became involved.

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* Horse No. 89, Surra, recovered after the prolonged administration of arsenic and when reinoculated with Surra trypanosoma 18 months later, ultimately succumbed to the disease, in a modified form. The hæmatozoon only appearing in scanty numbers in the circulation during the paroxysms which occurred.

Between the 5th and 7th July, the ulcers which first appeared on *Monarch* healed, leaving white patches or cicatrices on the mucous-membrane. On the 8th and 9th, vesicles and ulcers were observed, some fresh and others healing, while on the 10th a semi-confluent eruption exhibiting the characteristics of those already mentioned, made its appearance on the external surface of the sheath. During the period which had elapsed between the 18th June and 10th July, large numbers of plaques made their appearance, some 44 in all, distributed over the cutaneous surface of the body of the affected animal, and on the 15th of the latter month the right testicle increased in size, and was found to be tender on manipulation, while six days later a small disseminated urticarial eruption became visible implicating more or less the whole surface of the body not occupied by the previously existing plaques. On the 30th July film-like scabs black in colour separated from the tissue around the anus and disclosed four leucodermic patches; three more made their appearance on the 6th September, making seven in all, while on the 10th and 16th respectively two appeared on the posterior surface of the scrotum, and on the 30th of the same month one was noted for the first time on the external surface of sheath. A symptom not previously noted was observed, two days after the eruption of No. 81 plaque implicating the posterior surface of the left arm, the hair covering the raised portion fell out and left the skin balled. There did not appear to be any localized elevation of temperature in the affected area, as far as could be determined.

Plaques.—The eruption of plaques in this animal were very numerous, *viz.*, 82 in a period of 6 months, the first appeared on the 6th June and the last of the above-mentioned series became visible on the 8th December, 27 made their appearance during the month of June, 42 in July, 7 in August, 3 in September, 2 in October and 1 each in November and December, respectively. In addition, 11 of the plaques appeared on two occasions with a short interval between each eruption, and one No. 70 on three occasions.

Disseminated urticaria.—The marked features in this case have been (*i*) the large number of plaques which have appeared on the cutaneous surface of the body: (*ii*) the repeated eruptions of the disseminated form of urticaria which have persisted for long periods; even after fading they have reappeared within 24 hours, to again persist for another long spell.

The great peculiarity of this eruption has been its fugitive nature, for one day it affected the whole surface of the body, not already implicated by existing plaques, the following the skin of any region might be the seat of the eruption, and third it might be located to a totally different region, while on the fourth it again became general in character.

Œdemata.—Again, in this case the alternate augmentation and diminution of the œdemata affecting the sheath and under-surface of the abdomen have been especially noticeable. In the absence of any definable cause, the swelling and œdema would become visible, increasing gradually in dimensions for several days, then remaining stationary, decreasing suddenly or taking some days in the process, until it finally disappeared, only to reappear in the course of 24 hours or a few days and then pass through the same phases as above described on several occasions. During the cold weather, this intermittent œdematous engorgement of the sheath and under-surface of the abdomen has been noticed to be at a minimum, and except that the animal presents a generally unhealthy appearance the slight œdema of the sheath is the only symptom of Dourine apparent.

Glands.—The superficial inguinal glands became enlarged and hard on the 26th June 1903, and a month later were found to be still larger than normal, but softer in consistency. On August 18th, the glands were still slightly enlarged, soft on manipulation but lobulated. The condition of the submaxillary glands has remained unaltered except that they have slightly increased in size. The right testicle became increased in dimension and tender to the touch on July 15th, 1903, and on January 12th, 1904, it still remained larger than the left, but the spermatic cords were not thickened.

Body temperature.—During a period of 9 months, the maximum temperature recorded was 39·7°C. and the minimum 36·5°C. On five occasions only has it exceeded normal limits, and then only for one reading in the evening, generally followed by a low temperature on the following morning and a fresh eruption of either subcutaneous plaques or disseminated urticaria.

MONARCH.

TABLE XIV

Showing the number of plaques and eruptions of disseminated urticaria, with their dates of appearance and disappearance together with the duration of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering, May 9th, 1908.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				DURATION OF PLAQUES.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		1st.	2ND.		
		Days.	Appeared.	Disappeared.	Appeared.	Disappeared.	Days.	Days.		
			1908.	1908.						
1	L. flank	34	June 6th	June 8th	...	...	2	...	2·5 diam.	Pitted in centre, well raised circumference.
2	L. flank ...	34	,, 6th	,, 7th	...	...	1	...	2·5 ,,	Pitted in centre, fairly raised.
3	R. abdomen	34	,, 6th	,, 7th	June 25th	July 5th	1	10	2·0 ,,	Pitted in centre, well raised border (26th) No. 3 and 16 united (30th) 3 and 16 more prominent.
4	L. side sheath	35	,, 7th	,, 10th	,, 18th	June 21st	3	3	2·5×2·0	Urticarial soft, well raised.
5	R. shoulder	36	,, 8th	,, 10th	...	...	2	...	1·5×0·5	Pitted, well raised circumference.
6	L. ribs ...	50	,, 22nd	,, 22nd	...	...	1	...	1·5×1·0	Urticarial, raised, soft.
7	L. ribs ...	50	,, 22nd	,, 22nd	...	...	1	...	1·5×1·0	Urticarial, well raised, soft.
8	L. hip ...	51	,, 23rd	,, 25th	...	...	2	...	1·5 diam.	Pitted in centre, well raised circumference.
9	R. shoulder		,, 23rd	,, 28th	...	...	5	...	2·5 ,,	Semi-lunar in form, pitted, hard.
10	R. shoulder	51	,, 23rd	July 6th	...	...	13	...	1·5 ,,	Pitted in centre, raised part firm, (25th) increased in size.
11	R. shoulder	51	,, 23rd	June 24th	...	...	1	...	0·5 ,,	Urticarial, slightly raised firm.
12	R. hip ...	51	,, 23rd	,, 24th	...	...	1	...	0·5 ,,	Pitted in centre, circumference well raised.
13	R. ribs ...	51	,, 23rd	,, 25th	...	...	2	..	3·0 ,,	Urticarial, raised firm.
1	R. flank ...	53	,, 25th	,, 26th	...	...	1	...	0·5 ,,	Urticarial, well raised.
15	R. neck ...	53	,, 25th	,, 30th	..	...	5	...	2·0 ,,	Flat ([illegible]) increased in size, urticarial.
16	L. flank ...	55	,, 27th	July 1st	...	...	4	...	0·5 ,,	Urticarial (28th) joined with No. 3.

TABLE XIV—*contd.*

Showing the number of plaques and eruptions of disseminated urticaria, with their dates of appearance and disappearance together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering, May 9th, 1903.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				DURATION OF PLAQUES.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		1st.	2nd.		
		Days.	Appeared.	Disappeared.	Appeared.	Disappeared.	Days.	Days.		
			1903.	1903.						
17	R. ribs ...	58	June 28th	July 6th	...	...	8	...	1·0 diam.	Pitted in centre, well marked.
18	R. ribs ...	56	,, 28th	June 30th	...	...	2	...	0·5 ,,	Urticarial, slightly raised.
19	L. withers	56	,, 28th	,, 30th	...	...	2	...	0·5 ,,	Pitted in centre, raised circumference.
20	L. ribs ...	56	,, 28th	July 11th	...	...	13	...	0·5 ,,	Pitted in centre, (2nd) 1·25 diam., (3rd) 1·75 diam., (4th) 2·0 diam.
21	L. hip ...	56	,, 28th	,, 5th	...	...	7	...	0·5 ,,	Urticarial, raised.
22	L. hip ...	56	,, 28th	,, 5th	...	..	7	...	1·0 ,,	Pitted in centre, well raised.
23	L. hip ...	56	,, 28th	June 30th	...	...	2	...	0·5 ,,	Urticarial, slightly raised.
24	L. flank...	56	,, 28th	July 3rd	...	...	5	...	0·75 ,,	Pitted in centre, well raised circumference.
25	R. hip ...	56	,, 28th	,, 3rd	...	...	5	...	0·5 ,,	Urticarial, slightly raised.
26	L. thigh	56	,, 28th	,, 1st	...	...	3	...	0·5 ,,	Urticarial, slightly raised, (30th) 1·0 diam.
27	R. neck	57	,, 29th	,, 4th	...	...	5	...	2·0×1·5	Urticarial, well raised.
28	L. flank...	60	July 2nd	,, 4th	..	...	2	...	1·25 diam.	Pitted in centre, raised.
29	L. flank...	60	,, 2nd	,, 5th	...	..	3	...	1·25 ,,	Pitted in centre, raised.
30	R. hip ...	61	,, 3rd	,, 4th	...	...	1	...	0·5 ,,	Urticarial, small, soft.
31	R. hip ...	61	,, 3rd	,, 5th	...	...	2	...	3·0×2·0	Urticarial, irregular in form, raised.
32	R. hip ...	61	,, 3rd	,, 5th	July 6th	July 8th	2	2	0·5 diam.	Pitted in centre, raised circumference.
33	R. hip ...	61	,, 7th	,, 8th	...	...	1	...	0·75 ,,	Pitted in centre, raised circumference, (7th) increased.

TABLE XIV—*contd.*

Showing the number of plaques and eruptions of disseminated urticaria, with their dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering, May 9th, 1903.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES. FIRST TIME.		SECOND TIME.		DURATION OF PLAQUES. 1ST.	2ND.	Dimensions of plaques in inches.	REMARKS.
		Days.	Appeared.	Disappeared.	Appeared.	Disappeared.	Days.	Days.		
			1903.	1903.						
34	R. hip ...	61	July 3rd	July 8th	...	...	5	—	0·5 diam.	Urticarial when marked, (7th) increased.
35	L. hip ...	61	,, 3rd	,, 4th	July 6th	July 8th	1	2	2·0×1·5	Pitted in centre, well raised circumference.
36	L. hip ...	61	,, 3rd	,, 5th	,, 6th	,, 8th	2	2	1·0 diam.	Pitted in centre, well raised circumference.
37	R. ribs ...	61	,, 3rd	,, 8th	...	..	5	...	1·0 ,,	Pitted in centre, (5th) increased 2·0 diam., (7th) 2·5 diam.
38	R. ribs ...	61	,, 3rd	,, 5th	...	...	2	...	4·5×2·5	Oval, pitted, slightly raised.
39	R. thigh .	61	,, 3rd	,, 5th	July 6th	July 8th	2	2	2·0 diam.	Pitted in centre, well raised circumference.
40	L. ribs . .	61	,, 3rd	,, 8th	...	...	5	...	0·5 ,,	Pitted in centre.
41	L. ribs .	61	,, 3rd	,, 5th	...	...	2	...	1·0 ,,	Urticarial, raised soft.
42	R. ribs .	61	,, 3rd	,, 5th	...	...	2	...	1·5 ,,	Pitted in centre, raised circumference.
43	L. axill .	61	,, 3rd	,, 7th	...	...	4	...	0·5 ,,	Urticarial, raised soft, (5th) increased 2·0 diam.
44	L. ribs .	64	,, 6th	,, 11th	...	...	5	...	0·75 ,,	Pitted in centre, raised circumference.
45	L. shoulder	64	,, 6th	,, 8th	...	...	2	...	0·25 ,,	Urticarial, soft (7th) fused 1·5 diam., circular, soft.
46	L. shoulder	64	,, 6th	,, 8th	...	...	2	...	0·25 ,,	Urticarial, soft (7th) fused 1·5 diam., circular, soft.
47	R. shoulder	64	,, 6th	,, 11th	...	...	5	...	1·0 ,,	Pitted in centre, (7th) 1·5 diam., (9th) more prominent.
48	R. ribs. .	64	,, 6th	,, 8th	...	...	2	...	0·5 ,,	Urticarial, well raised.

TABLE XIV—*contd.*

Showing the number of plaques and eruptions of disseminated urticaria, with their dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering, May 9th, 1903.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				DURATION OF PLAQUES.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		1st.	2nd		
		Days.	Appeared.	Disappeared	Appeared.	Disappeared.	Days.	Days.		
			1903.	1903.						
49	R ribs. .	64	July 6th	July 8th	..	...	2	...	0 5 diam.	Urticarial, well raised.
50	L. ribs. .	70	,, 12th	,, 14th	July 22nd	July 23rd	2	1	1·0 ,,	Pitted in centre, hard, circumference well raised.
51	R. ribs .	73	,, 15th	,, 16th	...	...	1	...	0·5 ,,	Urticarial, well raised.
52	R. ribs .	73	,, 15th	,, 16th	...	...	1	...	0·5 ,,	Urticarial, well raised.
53	R. ribs .	73	,, 15th	,, 16th	...	...	1	..	0·5 ,,	Urticarial, well raised.
54	R. ribs .	73	,, 15th	,, 16th	...	...	1	...	0·5 ,,	Urticarial, well raised.
55	R. ribs .	73	,, 15th	,, 21st	...	...	6	.	1·0 ,,	Urticarial, (17th) increased, 2·0 diam. pitted in centre.
56	L. ribs .	73	,, 15th	,, 22nd	...	...	7	..	1 0 ,,	Pitted in centre, hard circumference.
57	L. ribs .	74	,, 16th	,, 20th	...	..	4	..	1·5 × 0 75	Urticarial, raised.
58	R. ribs .	75	,, 17th	,, 19th	...	..	2	...	1·25 diam.	Pitted in centre, well raised circumference.
59	R. ribs .	75	,, 17th	,, 19th	..	...	2	...	0·75 ,,	Pitted in centre, well raised circumference.
60	R. ribs .	77	,, 19th	,, 20th	...	...	1	.	4·0 ,,	Urticarial, raised.
61	L. ribs .	78	,, 20th	,, 23rd	...	...	3	...	1·0 ,,	Pitted in centre, well raised.
62	R. ribs .	78	,, 20th	,, 24th	...	...	4	...	0·5 ,,	Urticarial, (21st) increased in size 3·0 diam.
...	over body .	79	,, 21st	Aug. 11th	...	...	21	...	...	Disseminated urticarial (general).
63	R. ribs. .	80	,, 22nd	,, 1st	Aug. 2nd	Aug. 4th	10	2	2·5 diam.	Urticarial, (26th), increased in size.
64	L. shoulder	80	,, 22nd	July 27th	...	...	5	...	2·0 ,,	Urticarial, raised.

TABLE XIV—*contd.*

Showing the number of plaques and eruptions of disseminated urticaria with their dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.						DURATION OF PLAQUES.			Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.		THIRD TIME.		1ST.	2ND.	3RD.		
			Appeared.	Disappeared.	Appeared.	Disappeared.	Appeared.	Disappeared.	Days.	Days.	Days.		
		Days.	1903.	1903.	1903.	1903.	1903.	1903.					
65	L. ribs .	80	July 22nd	July 24th	...	...	...	...	2	...	...	2·0 diam.	Urticarial, raised.
66	R. shoulder	83	" 25th	" 28th	...	...	...	...	3	...	...	1·0 "	Pitted in centre.
67	R. shoulder	83	" 25th	" 31st	...	...	...	...	6	...	...	1·5 "	Semi-lunar in form, border only raised.
68	R. ribs .	84	" 26th	" 28th	July 29th	Aug. 6th	...	...	2	8	...	2·0 x 1·5	Urticarial, raised, (1st to 5th) increased to 3·0 diam.
69	L. neck .	93	Aug. 4th	Aug. 11th	...	...	...	...	7	...	...	4·0 x 2·0	Oval, pitted, raised circumference.
70	L. neck .	93	" 4th	" 8th	Aug. 13th	Aug. 14th	Aug. 17th	Aug. 19th	4	1	2	1·0 x 0·5	Semi-lunar, soft, raised circumference.
71	L. ribs .	95	" 6th	" 8th	...	...	...	...	2	...	...	4·0 x 3·5	Pitted urticarial lumps grouped round in cluster.

72	L. shoulder	95	„ 6th	„ 8th	...	...	...	...	2	...	...	4·0 x 3·0	Composed of pitted urticarial lumps.
73	L. thigh .	99	„ 10th	„ 11th	...	...	...	...	1	...	...	3·0 diam.	Pitted in centre, raised circumference.
74	L. neck .	99	„ 10th	„ 11th	Aug. 16th	Aug. 19th	...	...	1	3	...	2 0 x 1·75	Urticarial, pitted.
	Over body	101	„ 12th	„ 22nd	...	...	...	...	10	...	...	...	Disseminated urticarial (general and fugitive).
75	R. ribs .	105	„ 16th	„ 17th	...	...	...	...	1	...	...	3·0 diam	Pitted in centre, raised circumference.
	Over body	114	„ 25th	Sep. 18th	...	...	...	...	24	...	...	...	Disseminated urticarial (general and fugitive).
76	R. ribs .	127	Sep. 7th	„ 10th	...	...	...	...	3	...	...	1·0 diam.	Pitted in centre, hard, circumference raised.
77	R. ribs .	133	„ 13th	„ 17th	...	...	...	...	4	...	...	2·5 diam.	Pitted in centre, surrounded by disseminated urticarial.
78	L. back .	133	„ 13th	„ 17th	...	...	...	...	4	...	...	3·0 x 1·5	Kidney-shaped, urticarial, raised.
	Over body	141	„ 21st	„ 23rd	...	...	...	...	2	...	...	...	Disseminated urticaria, general.
79	R. ribs .	166	Oct. 16th	Oct. 31st	...	...	...	...	15	...	...	5·0 x 3 0	Oval, urticarial, raised.
80	L. withers	167	„ 17th	„ 22nd	...	...	...	...	5	...	...	1 75 diam.	Pitted in centre, raised.
	Over body	172	„ 22nd	Nov. 19th	...	...	...	...	28	...	...	...	Disseminated urticaria, fugitive.

TABLE XIV—*contd.*

Showing the number of plaques and eruptions of disseminated urticaria with their dates of appearance and disappearance, together with the duration of each, respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.						DURATION OF PLAQUES.			Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME		THIRD TIME.		1ST	2ND	3RD		
			Appeared.	Disappeared.	Appeared.	Disappeared.	Appeared.	Disappeared.	Days.	Days.	Days.		
		Days.	1903.	1903.	1903.	1903.	1903.	1903.					
81	L. arm (posteriorly)	208	Nov. 27th	Nov. 30th	...	...	...	...	3	...	...	1·5 diam.	Raised circumference, (28th) increased to 2·5 × 2·0.
	L. wither	211	Dec. 1st	Dec. 19th	...	...	...	...	18	...	...	...	Disseminated urticaria, fugitive.
82	R. elbow .	219	„ 8th	„ 11th	...	...	...	...	3	...	...	1·0 × 0·75	Urticaria, semi-solid, well raised.
	Over body	234	„ 23rd	1904. Jan 9th	...	...	...	...	17	...	...	...	Disseminated urticaria.
	Over body	254	1904 Jan. 12th	„ 23rd	...	...	...	...	11	...	...	...	Disseminated urticarial loin, R. neck and R. hip.
83	R. thigh .	282	Feb. 9th	Feb. 27th	...	...	...	...	16	...	...	2·5 diam.	Urticarial, pitted in centre.
84	R. hip .	288	„ 15th	„ 25th	...	...	...	...	10	...	...	3·0 × 1·5	Kidney-shaped urticarial.

	R. neck .	294	„ 21st	„ 26th	...	...	...	...	5	...	...	...	Disseminated urticaria.
85	R. hip .	312	Mar. 10th	Mar. 16th	...	...	...	...	8	...	...	4·0 diam.	Pitted in centre.
86	L. thigh .	324	„ 22nd	...	...	...	...	...	...	...	...	3·0 „	Ditto.
87	L. neck .	326	„ 24th	...	...	...	...	...	...	...	...	2·0 „	Urticarial.
88*	L. flank .	331	„ 29th	Mar. 31st	...	...	...	...	2	...	...	2·5 „	Pitted in centre.

* Between 29th March and 18th October 1904, 56 fresh plaques have appeared.

The chief points of interest in this case lie in the fact that a clean and healthy Arab stallion *Monarch* was allowed to cover an Australian* mare (No. III), which latter animal had been inoculated on the mucous-membrane of the vagina, after scarification, with a trace of blood containing the trypanosoma from a Dourine plaque *Kilngarth* 17-20 days previous to the date of covering. In addition that the symptoms of Dourine in *Monarch* were carefully observed and noted day by day, as they successively appeared.

Further, that the first sign of Dourine in the horse, *viz.*, thickening of the sheath, was followed three days later by the eruption of three well-defined plaques. The undermentioned symptoms appeared in *Monarch* in a certain number of days after covering mare III (May 4th, 6th, 7th) 1903 in the following order according to whether the disease was contracted on the first or one of the subsequent dates mentioned.

MONARCH. TABLE XV.

No.	Symptoms in order of their appearance.	Date of coverings.	Date of appearance of symptoms.	No. of days intervening.	Mean No. of days.
		1903.	1903.		
1	Thickening of tissues of sheath	May 4th, 7th	June 3rd	30—27	29th
2	Appearance of plaques Nos. I, II, III.	,,	,, 6th	34—31	33rd
3	Trypanosoma discovered in the blood of plaques.	,,	,, 6th	34—31	33rd
4	Œdema, under surface of abdomen.	,,	,, 8th	36—33	35th
5	Erosion on m. m. of penis	,,	,, 11th	38—35	37th
6	Superficial inguinal glands, enlarged.	,,	,, 22nd	49—46	48th
7	Ulcers on glans and body of penis.	,,	July 4th	61—58	60th
8	Sores covering free portion of penis.	,,	,, 5th	62—59	61st
9	Old ulcers healed, leaving white cicatrices or patches.	,,	,, 7th	64—61	63rd
10	Eruption on ext. surface of sheath	,,	,, 10th	67—64	66th
11	Right testicle increased in size and tender.	,,	,, 15th	72—69	71st
12	Disseminated urticaria over body 1st eruption.	,,	,, 21st	78—75	77th
	Leucodermic patches involving tissues around anus.	,,	,, 30th	87—84	86th

TABLE XV—*contd.*

No.	Symptoms in order of their appearance.	Date of Covering.	Date of appearance of symptoms	No. of days intervening.	Mean No. of days.
		1903.	1903.		
14	Leucodermic patches involving tissues around anus on scrotum	May 4th, 7th „	Sep. 6th	125—122	124th
15	„ „ . .	„	„ 10th	129—126	128th
16	„ „ on sheath	„	„ 30th	149—146	148th
17	Hair fell out from plaque No 81	„	Nov. 29th	209—206	208th
18	Cessation in eruption of plaques	„	Dec 8th	218—215	217th
			1904.		
19	Weakness in hind limbs . .	...	Feb. 25th	298—295	297th
20	Hæmaturia-granular casts in urine.	...	„ 20th	293—290	292nd
21	Second attack . . .	...	„ 29th	202—299	301st
22	Third attack		Mar. 27th	329—326	328th

MARE I.

Covered by Arab stallion Shamsher *the subject of chronic Dourine—Disease not communicated—Six weeks later served by a second horse* Kilngarth *(thorough-bred English) the subject of more recent disease—After further period of three weeks, congestion of vaginal m. m. observed and first cutaneous plaque appeared 30 days after union with second horse—Appearance of 27 plaques and several distinct eruptions of disseminated urticaria during a period of 20 weeks—Swelling and œdema of vaginal m. m. which later extended to perinæum and udder—Swelling and hardening of submaxillary glands—Sexual excitement more or less present during whole period the disease lasted—Weakness followed later by completed loss of power over hind quarters—Trypanosomata frequently found in the blood of the plaques but never free in that of the general circulation—Vaginal secretion although frequently examined never revealed the presence of the protozoon—Course of disease from date of covering by* Kilngarth *until that of death, 175 days.*

Mare covered on several occasions during June 1903 by apparently healthy horse Vendor, *but no external genital manifestations of the disease followed as a result of the union.*

A bay Australian mare foaled in 1895, 15-2½ hands, was cast from the Government Remount Depôt, Saharanpur (No. 7827), on the 19th February 1903, suffering from chronic Laminitis, but otherwise in excellent condition. She was received on the 20th February 1903 at Bareilly Laboratory.

On the 22nd and 25th February, this animal was covered by *Shamsher*, an Arab horse, the subject of chronic Dourine, of many months duration. No sores or abrasions existed on the genital organs of the stallion at the time of covering and the ejaculated fluid which presented the characteristics of water only did not contain any trypanosomata or spermatozoa.

During the period which elapsed between the arrival of the mare at Bareilly, 20th February, and the 10th April 1903, when she was transferred to the Muktesar Laboratory (elevation 7,500 ft.), the rectal temperature only rose to 38·2° C.

After a period of six weeks had been allowed to elapse from the date of the former covering, and as no symptoms of any kind, the result of the union, manifested themselves, the mare was served on two occasions on the 3rd and 8th April by a thorough-bred English horse, *Kilngarth*,* the subject of Dourine for some months past.

On the 25th April it was observed that the vaginal mucous membrane of mare I was very much congested, and that on the following day the right labium was swollen and œdematous, and that on the 27th the symptoms were still more marked. These symptoms, however, decreased and subsided in the course of the next few days. On the 2nd May, the first plaque made its appearance on the right side over the ribs; it was circular in form, 2·5 inches in diameter and pitted in the centre. It would therefore appear that this mare contracted the disease at the time of or directly after the first union, and that the period of incubation occupied only 30 days.

Between the 3rd and 7th May inclusive, the plaque gradually decreased in size and prominence; on the 8th slight thickening of the cuticle over its site occurred, but this was only temporary and the plaque disappeared on the morning of the 10th. During the interval until the 20th no symptoms were observed, but on that day the vaginal m. m. was observed to be œdematous and the passage patent; this condition persisted for a period of only 48 hours and then subsided. It, however, recurred in a more aggravated form on the 31st and continued until the 11th June, when it again disappeared.

On June 19th, a fresh plaque No. 2 (urticarial) appeared on the left ribs circular in form, 1 inch in diameter, with well raised border. The following morning it had increased in size and measured 4″ × 3″ × 9·5″ and was soft in consistency, but during the following 24 hours decreased so that only a slight thickening of the skin over the former seat of the plaque could be felt. All signs had disappeared on the morning of the 23rd. On this date also the vaginal m. m. again became swollen and œdematous and the submaxillary glands which had up to this time been normal in size, now were found to be enlarged and hard.

29th June.—A fresh plaque No. 3 (urticarial) oval in form 2′ × 1·5″ appeared on the left side of the neck and persisted for an inordinate period.

Between June 30th and July 22nd plaque No. 3 remained unaltered, and the œdema of vaginal m. m. varied in amount. The mare during this period was always in a condition of œstrum. On the latter date two fresh plaques appeared, No. 4 on the left hip, circular, 1·25 inches in diameter, slightly raised above the level of the surrounding tissues. No. 5 (urticarial), small. on the left side of the abdomen. Tem. A.M. 37·6° C., P. 50, R. 18 ; P.M. 37·7° C., P. 52, R. 14.

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*This animal was received from Major Pease, Principal, Lahore Veterinary College, who has published notes on the initial symptoms observed up to its being sent to Bareilly.

23rd.—Plaques Nos. 3, 4, and 5 have decreased in size, œdema of the vaginal m. m. persists. Tem. A.M. 37·3° C., P. 48, R. 16 ; P.M. 38·0° C., P. 52, R. 18.

24th.—Plaques Nos. 3, 4, and 5 have decreased, but œdema of vaginal m. m. persists. Tem. A.M. 37·4° C., P. 50, R. 13 ; P.M. 37·7° C., P. 42, R. 16.

25th.—During the night plaque No. 5 disappeared, but Nos. 3 and 4 remained unaltered, œdema as before. Tem. A.M. 37·4° C., P. 40, R. 14 ; P.M. 37·5° C., P. 40, R 16.

26th.—A fresh plaque No. 6, circular, 0·5 inch diameter, much raised and soft, has appeared on the right side of the body over the ribs. No. 4 has decreased and No. 3 persists, œdema remains stationary. Tem. A.M. 37·2° C., P. 44, R. 76 ; P.M. 37·3° C., P. 48, R. 14.

27th.—Plaque No. 6 has decreased and Nos. 3 and 4 persist. Œdema unaltered. Tem. A.M. 37·3° C., P. 34, R. 18 ; P.M. 37·8° C., P. 38, R. 28.

28th.—A fresh plaque No. 7 (urticarial), circular, 1 inch in diameter, hard, has appeared on the left hip. No. 6 has disappeared and No. 3 has decreased in size, but No. 4 persists. Œdema as before. Tem. A.M. 37·3° C., P. 52, R. 16 ; P.M. 37·5° C , P. 42, R 14.

29th.—Plaque No. 7 has increased in size, No. 4 decreased, but No. 3 persists as also the œdema of the vaginal m. m. Tem. A.M. 37·4° C., P. 42, R. 18 ; P.M 37·7° C., P. 46, R. 14.

30th.—Plaques Nos. 3 and 4 have decreased, but No. 7 is unchanged. Tem. A.M. 37·4° C., P. 42, R. 12 ; P.M. 37·8° C., P. 44, R. 15.

31st.—All the plaques have decreased in size during the past 24 hours and the mucous membrane of the vagina is petechiated as well as œdematous. Tem. A.M. 37·4° C., P. 40, R. 17 ; P.M. 37·4° C., P. 42, R. 18.

August 1st.—Two fresh plaques have made their appearance. No. 8, (urticarial) on the left loins is irregular in shape, and slightly raised. No. 9 on the right ribs is but poorly marked, being but little raised above the surrounding tissues. Nos. 4 and 7 have disappeared and No. 3 has decreased somewhat in size. Tem. A.M. 37·3° C., P. 36, R. 12 ; P.M. 37·7° C., P. 40, R. 24.

2nd.—During the past 24 hours Nos. 8 and 9 have disappeared, but No. 3 persists. Other symptoms remain unchanged. Temp. A M. 37·5° C., P. 42, R. 22 ; P.M. 37·7° C., P. 42, R. 28.

3rd.—The only plaque which now remains is No. 3. Vaginal symptoms unaltered. Temp. A.M. 37·2° C., P. 38, R. 20 ; P.M. 37·9° C., P. 40, R. 26.

4th.—Two fresh plaques have made their appearance. No. 10, circular, pitted in the centre, 1·5 inches in diameter, on the right side of the abdomen. No. 11 (urticarial) about 0·75 inch in diameter, also on the right side of the abdomen. No. 3 persists. Vaginal symptoms unchanged. Temp. A.M. 37·8° C., P. 38, R. 16 ; P.M. 37·0° C., P. 38, R. 18.

5th.—Plaque No. 11 has decreased, but the other two remain as before. The petechiæ have disappeared from the vaginal m. m. Œdema continues. Tem. A.M. 37·0° C., P. 36, R. 13 ; P.M. 37·7° C., P. 38, R. 14.

6th.—Plaques Nos. 3, 10, and 11 and œdema persist. Temp. A.M. 37·5° C., P. 36, R. 14; P.M. 37·9° C., P. 40, R. 18.

7th.—Plaques Nos. 3, 10, and 11 and œdema persist. Temp. A.M. 37·3° C., P. 36, R. 16; P.M. 37·6° C., P. 42, R. 16.

8th.—Plaque No. 10 has disappeared and Nos. 3 and 11 have decreased. Other symptoms persist. Tem. A.M. 37·3° C., P. 36, R. 12; P.M. 38·0° C., P. 42, R. 20.

9th.—The condition of the animal remains unchanged. Temp. A.M. 37·6° C., P. 44, R. 16; P.M. 37·5° C., P. 48, R. 14.

10th.—A disseminated urticarial eruption of small, circular, slightly raised patches appeared on the right side of the abdomen. Plaques Nos. 3 and 11 persist. Temp. A.M. 37·5° C., P. 40, R. 16; P.M. 38·1° C., P. 44, R. 18.

11th.—The disseminated urticarial eruption remains unchanged as also plaques Nos. 3 and 11. Temp. A.M. 37·7° C., P. 38, R. 14; P.M. 37·6° C., P. 42, R. 16.

12th.—The condition of the animal remains unchanged. Temp. A.M. 37·7° C., P. 46, R. 16; P. M. 38·0° C., P. 44, R. 14.

13th.—Several fresh patches of disseminated urticaria have appeared over the left hip, otherwise the symptoms have remained unchanged. Temp. A.M. 37·7° C., P. 42, R. 16; P.M. 37·9° C., P. 46, R. 20.

14th.—Six fresh plaques have appeared on different parts of the animal's body, five over the right ribs, and one No. 17 over the left ribs. They are all circular, slightly raised and pitted in the centre. The diameters of Nos. 12, 13, and 14 are all the same, 1·5 inches, those of 15 and 16 only 0·5 inch, while No. 17 has a diameter of 2 inches. The disseminated urticaria on the different parts of body retains its prominence, but plaques Nos. 3 and 11 have decreased in size. The other symptoms remain unchanged Temp. A.M. 37·5° C., P. 44, R. 16; P.M. 37·8° C., P. 42, R. 20.

15th.—Plaques Nos. 12 and 14 have decreased in size, and Nos. 3, 11, 13, 15, 16, and 17, though raised, are less prominent than they were when last noted. Temp. A.M. 37·4° C., P. 54, R. 16; P.M. 38·0° C., P. 44, R. 20.

16th—Two fresh plaques have appeared since yesterday. No. 18 circular 2 inches in diameter, situated on the R. flank; the circumference is made up of small circular urticarial lumps somewhat raised, but all pitted in the centre. No. 19, circular, 3 inches in diameter, on the R. hip. Several fresh patches of disseminated urticaria have appeared on the R. and L. ribs. Plaques Nos. 3 and 11 have disappeared. Nos. 12, 14, 15, and 16 have decreased in size, while Nos. 13 and 17 have become more prominent. The other symptoms persist. Temp. A.M. 37·6° C., P. 48, R. 15; P.M. 38·4° C., P. 46, R. 14.

17th.—Five plaques have disappeared, Nos. 12, 14, 15, 16, and 18, while the patches of urticaria and Nos. 13, 17, and 19 have decreased. The other symptoms persist. Temp. A.M. 37·5° C., P. 48, R. 16; P.M. 37·9° C., P. 46, R. 14.

18th.—Plaques Nos. 13, 17, and 19 have disappeared, but the disseminated urticaria on the left ribs is still prominent, and fresh eruption of small spots has appeared over the skin of the left hip. Temp. A.M. 37·4° C., P. 48, R. 16; P.M. 37·9° C., P. 44, R. 15.

19th.—The eruption of small spots mentioned in yesterday's note as having appeared on the skin of the left hip have changed into a disseminated urticaria.

Other symptoms remain unchanged. Temp. A.M. 37·5° C., P. 38, R. 14; P.M. 37·7° C., P. 40, R. 16.

20th.—The urticarial eruption has become less prominent. Temp. A.M. 37·6° C., P. 40, R. 16; P.M. 37·7° C., P. 41, R. 16.

21st.—The condition of the animal remains unchanged. Temp. A.M. 37·4° C., P. 42, R. 18; P.M. 37·5° C., P. 40, R. 18.

22nd.—A fresh plaque No. 20 has appeared on the right hip near the croup, its outline is irregular but raised above the level of the surrounding tissues. The urticarial eruption is less marked. Temp. A.M. 37·5° C., P. 52, R. 16; P.M. 37·7° C., P. 48, R. 18.

23rd.—The urticarial eruption has faded somewhat and plaque No. 20 has decreased in size. Other symptoms unchanged. Temp. A.M. 37·3° C., P. 40, R. 14; P.M. 37·7° C., P. 44, R. 16.

24th.—A fresh crop of disseminated urticaria has appeared involving the skin covering both hips and also that of the left ribs. Other symptoms unchanged. Temp. A.M. 37·3° C., P. 40, R. 13; P.M. 37·7° C., P. 48, R. 16.

25th.—A fresh plaque No. 21 (urticarial), 3 inches in diam. soft to the touch and with irregular shaped border has appeared over the right hip. The disseminated urticaria involving the hips and ribs persists except over the right hip, there it is less prominent. Temp. A.M. 37·5° C., P. 46, R. 16; P.M. 37·8° C., P. 44, R. 15.

26th.—Plaque No. 21 and the urticarial eruption have decreased in prominence. The œdematous condition of the m. m. of the vagina persists. Temp. A.M. 37·5° C., P. 44, R. 16; P.M. 38·0° C., P. 48, R. 16.

27th.—Plaque No. 21 has disappeared during the night. Otherwise the symptoms remain unchanged. Temp. A.M. 36·8° C., P. 44, R. 12; P.M. 37·3° C., P. 38, R. 15.

28th.—The urticarial eruption has decreased. Other symptoms as previously noted. Temp. A.M. 36·9° C, P. 48, R. 18; P.M. 37·1° C., P. 52, R. 18.

29th.—The urticarial eruption is more marked on the hips. Otherwise the condition of the animal is unchanged. Temp. A.M. 37·4° C., P. 48, R. 18; P.M. 37·8° C., P. 48, R. 14.

30th.—Again the eruption has somewhat faded and is less distinct, otherwise condition of animal remains the same as yesterday. Temp. A.M. 37·5° C., P. 48, R. 16; P.M. 38·0° C., P. 48, R. 20.

31st.—The urticarial eruption has decreased on the hip and has now appeared on the left flank. Temp. A.M. 37·9° C., P. 44, R. 17; P.M. 38·0° C., P. 50, R. 18.

1st September.—Since yesterday the disseminated eruption of urticaria has decreased on the left side, but has become more marked on the right side of the body. Temp. A.M. 37·4° C., P. 42, R. 14; P.M. 38·0° C., P. 48, R. 16.

2nd to 6th.—During the next five days the disseminated eruption of urticaria varied in prominence but finally decreased. The œdema of the m. m of the vagina remained unchanged. The temperature never exceeded 38·4° C., and the pulse and respiration remained within normal limits.

7th.—The eruption of disseminated urticaria has disappeared. Temp. A.M. 38·1° C., P. 36, R. 13; P.M. 38·5° C., P. 38, R. 14.

8th.—The condition of the animal remains unchanged. Temp. A.M. 38·0° C., P. 44, R. 15; P.M. 38·3° C., P. 36, R. 18.

9th.—Symptoms of colic appeared at 3 A.M. The animal struggled considerably and at 8 A.M. was only able to get up and remain standing with difficulty. Temp. A.M. 38·8° C., P. 94, R. 28; P.M. 39·1° C., P. 72, R. 24.

10th.—No symptoms of colic since 8 A.M. yesterday morning. Both the front and hind fetlocks on the near side are swollen owing to injury whilst struggling during a paroxysm of colic. Mare horsing. Temp. A.M. 37·9° C., P. 48, R. 20; P.M. 38·4° C., P. 44, R. 18.

11th.—A fresh plaque No. 22, circular, 1·5 inches in diameter, pitted in the centre, has appeared on the site previously occupied by No. 5 on the left hip. It is surrounded by a disseminated urticaria to a distance of 0·75 inches from the circumference of the plaque. A fresh crop of urticaria has broken out on the skin of the right hip. Œdema persists. Temp. A.M. 35·°5 C., P. 54, R. 14; P.M. 37·6° C., P. 42, R. 16.

12th.—Plaque No. 22 and the urticarial eruption generally have decreased. There is swelling of both hind fetlocks. Temp. A.M. 37·7° C., P. 48, R. 14; P.M. 7·7° C, P. 38, R. 12.

13th.—Three fresh plaques have appeared on the R. side of the withers, all circular, 1·5 inches in diameter, urticarial in character and in a line. No. 24 in the centre, No. 23 in front, and No. 25 situated posteriorly. The urticarial eruption has decreased on the R. hip, and No. 22 persists. There is weakness in the hind quarters which become manifest when the mare is gently exercised. The left hock and both hind fetlocks are swollen, other symptoms remain unchanged. Temp. A.M. 37·8° C., P. 34, R. 14; P.M. 37·7° C., P. 56, R. 16.

14th.—Plaques Nos. 23, 24, and 25 have decreased. Temp. A.M. 37·0° C., P. 64, R. 18; P.M. 38·3° C., P. 60, R. 16.

15th.—Plaque No. 22 and the urticarial eruption have somewhat decreased in prominence. All the other symptoms persist. Temp. A.M. 39·2° C., P. 40, R. 14; P.M. 39·5° C., P. 40, R. 14.

16th.—During the night plaques Nos. 23, 24, and 25 have disappeared. The eruption on the R. hip and No. 22 plaque have decreased, while the urticaria involving the left hip and other symptoms persist. Temp. A.M. 39·3° C., P. 64, R. 16; P.M. 39·4° C., P. 68, R. 20.

17th.—Two fresh plaques Nos. 26 and 27 have appeared on the left side of the neck below the crest, situated in front of the site of No. 3, circular in form, measuring 0·5 and 1·5 inches in diameter, both are fairly well raised above the level of the surrounding tissues. No. 3 has reappeared and measures 3″×2·5″. Other symptoms remain unchanged. Temp. A.M. 38·5° C., P. 50, R. 17; P.M. 39·4° C., P. 56, R. 16.

18th.—One plaque No. 22 has decreased in size, but the others retain their prominence. Symptoms persist. Temp. A.M. 38·1° C., P. 58, R. 18; P.M. 39·5° C., P. 40, R. 18.

19th.—Plaque No. 22 has disappeared. Nos. 3, 26, and 27 persist. Other symptoms remain as previously noted. Temp. A.M. 39·7° C., P. 44, R. 20; P.M. 38·0° C., P. 45, R. 20.

20th.—The condition of the animal remains unchanged and all symptoms persist. Temp. A.M. 37·7° C., P. 42, R. 18; P.M. 38·0° C., P. 62, R. 20.

21st.—Disseminated urticarial eruptions have made their appearance over both hips, left side of the chest, and on the right wither. All the other symptoms remain unchanged. Temp. A.M. 37·8° C., P. 52, R. 20; P.M. 38·9° C., P. 50, R. 21.

22nd.—The animal was found this morning lying down, and when assisted to rise was found to be unable to maintain the erect position owing to weakness across the quarters. The urticarial eruptions have generally dissappeared and plaques Nos. 3, 26, and 27 have decreased in size and all other symptoms persist. Temp. A.M. 37·9° C., P. 50, R. 16; P.M. 39·2° C., P. 62, R. 20.

23rd.—The animal maintains the recumbent position, but nevertheless feeds well. With the exception of the period during which the attack of colic was present the appetite has never fallen off until yesterday morning; the appetite, however, returned later in the day and is now maintained. Plaque No. 3 has disappeared during the past 24 hours and Nos. 26 and 27 have decreased in size. The swelling and œdema of the vaginal m. m. has increased and extended over the perineal region to the udder. 5 P.M. the animal is restless but feeds well. The temperature has risen to 40·0° C. and the pulse and respirations accordingly. Temp. A.M 38·8° C., P. 40, R. 18; P.M. 40·0° C., P. 66, R. 32.

24th.—The animal after a restless night succumbed at 7-30 A.M.

This mare was in season during almost the entire period between contracting the disease and death.

Only a clear watery fluid exuded at times from the vaginal m. m., and although diligently searched for, the trypanosoma was never discovered in the secretion collected daily for microscopical examination.

Trypanosomata were found in the blood of the plaques on numerous occasions, but never in the blood of the general circulation of the animal.

AUTOPSY.—At 11 a.m. 24th September 1903. The skin was removed carefully in order to observe whether any changes could be noted at the former seats of plaques which had persisted for several days and then disappeared. But no changes were found. At the time of death two plaques, Nos 26 and 27, existed but were fading. On the removal of the skin from the right side of the neck where these plaques were situated, a thin film of gelatinous material together with discolouration of the tissues at the seat of the patches respectively, were all the signs noted.

On opening the chest, no fluid was found in the pleural cavities. *Lungs* deeply congested, apices almost black in colour and the seats of slight emphysema. *On section* œdema of both organs. *Pericardial sac* contains only a few cubic centimetres of an orange coloured fluid. *Heart* weighs 9 ℔. 2 ozs. enlarged. External surface yellowish red in colour, dotted over its surface are minute dark red petechiæ. *On section* the valves are stained a yellow colour, but there are no subendocardial extravasations. Muscle fatty. *Liver* weighs 18 ℔. 10 ozs., enlarged, dark red in colour. *On section* the tissues are firm and present a fairly healthy appearance. *Spleen* weighs 3 ℔. 12 ozs., nearly twice the normal size. External surface of organ petechiated. *On section* tissues are somewhat softer than in normal condition and dark in colour.

Kidneys R. 1 lb. 12 ozs., L. 1 lb. 11½ ozs., nothing abnormal microscopically. *Genital organs. External*—Labia vaginæ considerably increased in size, and œdematous. On removal of the skin a yellow coloured gelatinous material was found extending from the labia to the udder. *Internal.* The m. m. of the vagina is of an orange colour, the capillaries are injected and arborescent in their distribution. Several raised œdematous temours are present and projecting inwards from the surface of the m. m. these are dark-red in colour and most resemble a common variety of anemone found attached to rocks bordering on the sea coast.

Spinal membranes and cord.—On section, the membranes contain a small quantity of a clear, pale fluid; the vessels on the surface of the cord are only slightly injected and the tissues of the cord are pale in colour. *On section* the cord appears to be fairly firm in consistency and no centres of softening are visible in the dorsal or lumbar portions as might be expected. No mature trypanosomata were discovered on microscopical examination of the fresh tissues or in the cerebro-spinal fluid.

MARE I. TABLE XVI.

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each, respectively.

Serial No. of plaques.	Situation of plaque.	Appearance of plaque after covering.	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.		Duration of plaques in days.	Dimension of plaques in inches.	REMARKS.
			Appearance.	Disappearance.			
		Days.	1903.	1903.			
1	R. ribs . .	80	May 2nd	May 10th	8	2·5 diam.	Pitted in centre.
2	L. ribs . .	78	June 19th	June 23rd	4	1·0 ,,	Circular; raised, 4 × 3 × 0·5
3	L. side neck .	88	,, 29th	Aug. 16th	48	2 0 × 1·5	Oval, urticarial.
4	L. hip . .	111	July 22nd	July 25th	3	1·25 diam.	Circular, urticarial.
5	L. abdomen .	111	,, 22nd	,, 25th	3	1·00 ,,	,,
6	L. ribs . .	115	,, 26th	,, 28th	2	0·5 ,,	,,
7	L. hip . .	117	,, 28th	Aug. 1st	4	1·0 ,,	,,
8	L. loin . .	121	Aug. 1st	,, 2nd	1	0 5 ,,	Urticarial.
9	R. ribs . .	121	,, 1st	,, 2nd	1	0 5 ,,	,,
10	R. side abdomen .	124	,, 4th	,, 8th	4	1·5 ,,	Pitted in centre.
11	R. abdomen .	124	,, 4th	,, 16th	12	0·75 × 0·5	Urticarial.
12	R. abdomen .	130	,, 14th	,, 17th	3	1 5 diam.	Pitted in centre.
13	R. ribs . .	134	,, 14th	,, 18th	4	1·5 ,,	,,
14	R. ribs . .	134	,, 14th	,, 17th	3	1·5 ,,	,,
15	R. ribs . .	134	,, 14th	,, 17th	3	0·5 ,,	,,
16	R. ribs . .	134	,, 14th	,, 17th	3	0·5 ,,	,,

TABLE XVI—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each, respectively.

Serial No of plaques	Situation of plaque	Appearance of plaque after covering	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.		Duration of plaques in days.	Dimension of plaques in inches.	REMARKS.
			Appearance.	Disappearance.			
17	R ribs . .	134	Aug 14th	Aug 18th	4	2 0 diam.	Pitted in centre.
18	R. flank . .	136	,, 16th	,, 17th	1	.	,,
19	R. hip . .	136	,, 16th	,, 18th	2	3 0 diam.	Urticarial.
20	R. hip . .	142	,, 22nd	,, 25th	3	1·5 × 0 75	,, kidney-shaped.
21	R. ribs . .	145	,, 25th	,, 27th	2	3 0 diam.	Urticarial.
22	L. hip . .	162	Sep 11th	Sept. 19th	8	1 5 ,,	Pitted in centre.
23	R. withers .	164	,, 13th	,, 16th	3	1·5 ,,	Urticarial.
24	R. withers .	164	,, 13th	,, 16th	3	1·5 ,,	,,
25	R. withers .	164	,, 13th	,, 16th	3	1·5 ,,	,,
26	L. side neck .	16[illegible]	,, 17th	...	...	2·5 ,,	,,
27	L. side neck .	168	,, 17th	...	...	1·5 ,,	,,

MARE II.

Covered by Arab stallion (Yadgir) *subject of the latent form of Dourine, symptoms of which had suddenly become active. Appearance on 10th day following covering of vesicles and ulcers on left labium pudendi and later by œdema of vaginal m. m. and other minor symptoms. Trypanosoma discovered in vaginal mucus on 34th day, persistence of protozoon at intervals during many months.*

Eruption of only three cutaneous plaques between 116th and 150th days and absence during the prolonged period which followed. Absence of cerebro-spinal symptoms for 253 days after covering.

A bay Australian mare, foaled in 1897, 15—2½ hands, Sire *Andante* by *Tim Swiveller*, was cast from the Government Remount Depôt, Karnal (No. 6417), on the 7th March 1903 as a bad roarer but otherwise in good condition. She was received on the 15th March 1903 at the Bareilly Laboratory, and removed to Muktesar Laboratory on the 10th April 1903.

On 7th May, during a period of œstrum, this animal was covered by *Yadgir*, an Arab horse for a long period the subject of latent Dourine. A sore was observed to exist over the root of the free portion of the penis while covering.

No symptom occurred until the morning of May 16th (10th day after covering) when a small ulcer was observed inside the left labium of vulva and twenty-four hours later fresh vesicles were noted, each surrounded by a halo red in colour, while the ulcer of the previous day persisted. Up to and including the

24th May there was an eruption of successive crops of vesicles which later formed ulcers and then disappeared. On the morning of the 27th all signs had disappeared.

June 2nd (*27th day*).—The m. m. of the vagina became œdematous, but this condition persisted for 48 hours only.

June 9th (*34th day*).—The vaginal m. m. was congested, but there was no discharge from the passage. Trypanosomata were found in cover-glass specimens of vaginal mucus.

June 22nd (*47th day*).—Submaxillary and superficial inguinal glands normal in size.

June 28th to 30th (*53rd to 55th day*).—Vaginal m. m. congested, trypanosomata present in small numbers in vaginal mucus.

Between 30th June and 22nd July (77th day). No symptoms were observed, but the vaginal mucus was found to contain the trypanosomata in small numbers on the latter date.

August 2nd (88th day). Vaginal mucus contained no trypanosoma. On August 4th two patches of leucoderma appeared on the external surface of the vulva on separation of film-like scabs from the surface of the tissues.

Between the 7th August (93rd day) and 15th September (132nd day) inclusive, a period of 39 days. A systematic examination of stained cover-glass specimens of the vaginal mucus was made daily, with a view to determine the number of trypanosomata, if any were present.

MARE II. TABLE XVII.

Showing the number of trypanosomata, with their presence in, and absence from, the vaginal mucus on the different dates mentioned.

DATE.	INTERVAL FROM DATE OF COVERING.	NUMBER OF TRYPANOSOMATA IN SPECIMENS EXAMINED.		NUMBER OF DAYS.		No. of stained cover-glass of many examined on each occasion.	REMARKS.
	Days.	Present.	Absent.	Present.	Absent.		
1903. June 9th	34	1	...	...	...	1	
" 28th	53	3	...	...	...	1	
July 22nd	77	5	...	...	...	1	
August 2nd	88	...	*Nil*	...	...	1	
" 7th	93	5	...	1	...	3	
" 8th to 13th	94—99	...	*Nil*	...	6	3	
" 14th	100	11	...	1	...	1	
" 15th to 17th	101—103	...	*Nil*	...	3	3	Petechiæ appeared on vaginal mucous membrane.

TABLE XVII—*contd.*

Showing the number of trypanosomata with their presence in, and absence from, the vaginal mucus on the different dates mentioned.

DATE.		INTERVAL FROM DATE OF COVERING.	NUMBER OF TRYPANOSOMATA IN SPECIMENS EXAMINED.		NUMBER OF DAYS.		No. of stained cover-glass of many examined on each occasion.	REMARKS.
		Days.	Present	Absent	Present	Absent.		
August	18th	104		...	4	...	1	
,,	19th	105	5	...		...	1	
,,	20th	106	7	...		...	1	
,,	21st	107	7	...		...	1	
,,	21st to 25th	108—111	...	*Nil*	...	3	2	
,,	26th	112	7	...	2	...	1	
,,	27th	113	1	...			2	
,,	28th	114	...	*Nil*	...	2	2	
,,	29th	115	2	...	1	...	2	
,,	30th to 31st	116—117	...	*Nil*	...	2	2	(30th) Plaques No. I and II appeared.
September	1st	118	1600	...	1	...	1	
,,	2nd to 3rd	119—120	...	*Nil*	...	2	2	
,,	4th	121	2250	...	2	...	1	
,,	5th	122	2	...			2	
,,	6th	123	...	*Nil*	...	1	2	
,,	7th	124	720	...	1	...	1	
,,	8th to 10th	125—127	...	*Nil*	...	3	2	
,,	11th	128	7	...	2	...	1	
,,	12th	129	405	...			1	
,,	13th to 15th	130—133	...	*Nil*	...	3	2	
October	3rd	150	...	*Nil*	...	..	2	Plaque No. III appeared.
,,	17th	164	90	...	1	..	1	
,,	24th	171	5	...	1	..	1	
December	10th	218	4008	...	1	...	1	
,,	24th	232	...	*Nil*	...	..	2	
,,	25th	233	1	..	1	...	1	
1904.								
January	4th to 8th	243—247	...	*Nil*	...	5	2	

30th August.—The first and second plaques made their appearance on the left flank and ribs respectively on the 116th day following the covering of the mare, and it was not until the 3rd October (150th day) that plaque No. 3 showed itself on the R. side of the chest. From this latter date up to the 31st January, an interval of 120 days, no further plaque had made its appearance.

On examination of the animal with the exception of the following symptoms none could be found referable to Dourine. These were small leucodermic patches on a somewhat thickened vulva, patency of the labia pudendi, slight œdema of the vaginal m. m., an occasional appearance of œdema in front of the udder, and slight enlargement of the submaxillary and superficial inguinal glands, which latter, however, were normal in consistency.

The temperature of this animal has been recorded daily, morning and evening, for ten months, during which period the maximum registered was 38·7° on one occasion only and the minimum 37·1° C. For days and weeks together the recorded temperatures never rose to 33·0° or fell to 37·0° C.

Points of interest.

1. Presence of trypanosoma in vaginal mucus 34 days after covering.
2. „ „ „ „ „ „ 84 days previous to eruption of first plaque.
3. Occurrence of paroxysms and intermissions of trypanosomata at irregular intervals.
4. Great increase in the number of trypanosomata in the vaginal mucus following eruption of first and second plaques.
5. Eruption of all three plaques during temporary absence of trypanosomata from vaginal mucus.
6. Small number of plaques (3) which manifested themselves during the course of the disease.
7. Symptoms mainly involving external genital organs.
8. No symptoms indicative of nerve lesions.
9. Two patches of leucoderma appeared on the vulva on 88th day after covering.

MARE II. TABLE XVIII.

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial number of plaque.	Situation of plaques.	Appearance of plaques after date of covering Days	Date of appearance and disappearance of plaque		Duration of plaques in days.	Dimension of plaque. Inches.	REMARKS.
			Appeared	Disappeared			
1	L. flank	116	1903. Aug 30th	1903. Sep 3rd	4	1·0 × 0·75	Urticarial.
2	L. ribs	116	„ 30th	„ 1st	2	1·0 diam.	„
3	R. crest	150	Oct. 3rd	Oct. 17th	14	6·0 × 1·0	„
4	L. neck	264	1904 Feb. 14th	1904. Feb. 16th	2	2·0 diam.	„

MARE III.

Scarification of minute portion of mucous-membrane of left labium vaginæ, with a needle, and inoculation of trace of fresh blood obtained from a Dourine plaque on English thorough-bred stallion Kilngarth—*Appearance on 12th day of vesicle followed by a small ulcer, which readily healed—Swelling and œdema of L. labium, which later involved whole external genitals and perinæum—Vaginal mucus contained the trypanosoma of Dourine—First plaque appeared on 34th day following inoculation, in the blood of which the trypanosomata were found on microscopical examination, followed at intervals during a period of 117 days by successive crops of plaques, numbering 80 in all, which involved the skin of the body and neck. Slight enlargement of the submaxillary glands—Weaknesses, later dragging of the hind limbs whilst walking—Swelling and suppuration of near hind limb—Inability to stand—Destruction*—Post-mortem—*Course of the disease 206 days.*

A bay Australian mare foaled in 1896, purchased 29th November 1901, 15-2½ hands, was cast from the Government Remount Depôt, Karnal (No. 6601), as a bad roarer, on the 7th March 1903. The animal when received at Bareilly was in good condition; the temp. during the following month always remained between 37° and 38° C.

April 17th, 1903.—Scarification with a fine needle was performed involving 0·5 c. m. square of the mucous-membrane of the left labium vaginæ in such a way as to draw little or no blood. A slight trace of blood was removed from a Dourine plaque from ***Kilngarth*** (thorough-bred English stallion) on the point of a scalpel and spread over the scarified m. m. and allowed to dry somewhat before the parts were brought in apposition. Between the 18th and 26th April inclusive, the animal fed well and exhibited no untoward symptoms. The morning and evening temperatures varied but a few points, the maximum and minimum readings being 38·1° I.C. and 37·1° C. respectively. The pulse and respirations averaged 36 and 12 respectively.

27th.—The vaginal m. m. at the site of scarification is congested. Temp. A.M. 37·4° C., P. 36, R. 10; P.M. 38·1° C., P. 34, R. 12.

28th.—A vesicle has appeared on the vaginal m. m. at the point of scarification. The left labium is swollen and œdematous. Temp. A.M. 39·1° C., P. 34, R. 11; P.M. 38·3° C., P. 32, R. 13.

29th.—The left labium has increased in size and the vesicle is larger than yesterday. Temp. A.M. 37·8° C., P. 32, R. 10; P.M. 37·6° C., P. 40, R. 14.

30th.—The left labium has increased in size since last noted and a small ulcer has appeared at the site of the vesicle. Temp. A.M. 38·0° C., P. 36, R. 12; P. M. 38·5° C., P. 36, R. 12.

May 1st.—The swelling and œdema of the left labium has increased still more in size since yesterday: there is no vaginal discharge. Temp. A.M. 37·9° C., P. 34, R. 12; P.M. 38·1° C., P. 44, R. 12.

2nd.—Swelling of the left labium has decreased, but the œdema is extending downwards towards the perinæum. Temp. A.M. 37·8° C., P. 42, R. 12; P.M. 38·3° C., P. 42, R. 16.

3rd.—The œdema which has spread to the perinæum is now spreading further downwards towards the mammary gland. Temp. A.M. 37·6° C., P. 40, R. 10; P.M. 37·9° C., P. 36, R. 12.

4th.—The swelling of the left labium and the œdema of the perinæum has decreased during the night—mare covered by *Monarch*, a clean Arab stallion. Temp. A.M. 37·7° C., P. 37, R. 10; P.M. 38·0° C., P. 40, R. 14.

Between the 5th and 30th May 1903 inclusive.—The swelling of the left labium and the œdema of perinæum decreased, although the mare was covered by *Monarch* on the 6th and 7th. The temperature during this period remained normal and the animal showed no further symptoms of the disease.

14th.—The left labium is again swollen and twice the size of the right. Temp. A.M. 37·6° C., P. 36, R. 12; P.M. 37·6° C., P. 36, R. 12.

15th.—The mare feeds grass, but left her ration of corn; the swelling of labium persists. Temp. A.M. 38° C., P. 36, R. 13; P.M. 38·1° C., P. 36, R. 12.

Between the 16th and 19th inclusive.—The animal fed well, the swelling of the left labium continued to increase slowly in size. The temperature varied between 37·7° C. and 38·3° C., while the pulse and respiration averaged 32 and 12 respectively.

20th.—The 34th day following inoculation; the first plaque appeared on the left side of the chest nearly circular in form and 2 inches in diameter. It made its appearance in the afternoon, at first only indistinct in outline, but later became well marked (photograph taken). The swelling of the left labium is decreasing slowly. Temp. A.M. 37·6° C., P. 32, R. 32; P.M. 38·6° C., P. 40, R. 14.

21st.—Plaque No. 1 persists. The swelling of left labium has slightly decreased during the night. Temp. A.M. 38·0° C., P. 36, R. 13; P.M. 38·2° C., P. 40, R. 18.

During the next four days, 22nd to 25th inclusive, the size of No. 1 plaque and the swelling of left labium decreased; temperature normal.

26th.—There is slight thickening at the seat of No. 1 plaque, and the swelling of the left labium persists. Temp. A.M. 37·8° C., P. 36, R. 16; P.M. 37·9° C., P. 32, R. 14.

27th.—Plaque No. 1 has entirely disappeared during the night and there is no means of locating its previous confines; swelling of left labium remains stationary. Temp. A.M. 37·7° C., P. 36, R. 13; P.M. 37·9° C., P. 34, R. 15.

Between the 28th May and 3rd June inclusive.—The symptoms decreased and the animal appeared in perfect health; temperature normal.

June 4th.—Plaque No. 1 re-appeared on the left side of the chest. Plaque No. 2 appeared on the left side of the chest over the ribs, semi-lunar in form, soft to the touch; it is 2½ inches in length and raised, and resembles an urticarial wheal in character. The mucous-membrane of the vagina is red in colour; no injection of vessels visible. The swelling of the left labium is decreasing. Temp. A.M. 37·6° C., P. 36, R. 14; P.M. 38·8° C., P. 40, R. 14.

5th.—Plaque No. 2 has decreased in size during the night, while No. 1 is more prominent. The vaginal mucous-membrane retains its red colour, but the swelling of the labium has decreased. Temp. A.M. 37·7° C., P. 40, R. 13; P.M. 38·3° C., P. 36, R. 13.

6th.—Plaques Nos. 1 and 2 have decreased in size, other symptoms stationary. Temp. A.M. 37·7° C., P. 36, R. 13; P.M. 38·0° C., P. 36, R. 14.

7th.—Plaque No. 2 has disappeared, and No. 1 has decreased in size. Swelling of left labium persists. Temp. A.M. 37·6° C., P. 32, R. 14; P.M. 38·4° C., P. 40, R. 16.

8th.—Plaque No. 1 has decreased, swelling persists. Temp. A.M. 37·8° C., P. 36, R. 12; P.M. 38·5° C., P. 36, R. 13.

9th.—Plaque No. 1 decreasing in size slowly, swelling persists. Temp. A.M. 37·7° C., P. 32, R. 10; P.M. 38·3° C., P. 36, R. 12.

10th.—Plaque No. 1 decreasing slowly. Swelling of labium persists. A fresh plaque No. 3 appeared at 4 P.M. on the right ribs behind the shoulder, 1 inch in diameter, circular, raised at the edges and pitted in the centre. Temp. A.M. 37·8° C., P. 32, R. 12; P.M. 38·2° C., P. 36, R. 12.

11th.—Plaque No. 1 is still visible. No. 3 has changed its characteristics during the night; the pitted centre has now become obliterated and the plaque has assumed a circular urticarial form, somewhat soft to the touch. A fresh plaque No. 4 has appeared on the left hip, circular in shape, well raised above the surrounding skin, 1½ inches in diameter and hard to the touch. Temp. A.M. 38·0° C., P. 32, R. 10; P.M. 38·2° C., P. 32, R. 14—photograph taken.

12th.—Plaques Nos. 1 and 3 have disappeared, the former for the second time, and plaque No. 4 persists. A scab has separated from the external surface of the left labium, leaving a leucodermic patch. Temp. A.M. 37·8° C., P. 36, R. 11; P.M. 38·0° C., P. 32, R. 12.

13th.—Plaque No. 4 has decreased in size during the night. Swelling of labium persists. Temp. A.M. 37·9° C., P. 32, R. 12; P.M. 38·2° C., P. 36, R. 14.

14th.—Plaque No. 4 has increased in size since yesterday. Swelling of labium persists. Temp. A.M. 37·3° C., P. 32, R. 12; P.M. 38·1° C., P. 32, R. 12.

15th.—Plaque No. 4 has remained stationary in size during the past 24 hours; the swelling of the labium has decreased. Temp. A.M. 37·8° C., P. 32, R. 11; P.M. 38·1° C., P. 40, R. 16.

16th.—Plaque No. 4 as well as the swelling of the labium have decreased in size. Temp. A.M. 37·9° C., P. 38, R. 16; P.M. 38·1° C., P. 40, R. 16.

17th.—Plaque No. 4 has again increased in dimensions. Five fresh plaques have appeared on the hips of the animal. No. 5 a small circular one, pitted in the centre, but raised at the circumference, situated a little lower than No. 4. No. 6, a small urticarial plaque below No. 5. No. 7, circular in form, 1 inch in diameter, well raised above the surrounding skin level, has appeared on the croup. No. 8, small, circular in shape, on left side of the croup, urticarial in character. No. 9, a small urticarial plaque on the right side of the point of the croup. In addition a large plaque No. 10—3·5 × 2·5 inches—has developed on the left side of the ribs accompanied by two smaller ones 10 (*b*) and (*c*) possessing urticarial characters. Later a third plaque 10 (*d*) developed several inches posterior to (*c*), but connected to it by a prominent lymphatic vessel.

No. 11 (urticarial) small on left side of the vulva. No. 12, small, 1·5 inches in diameter, pitted in centre, lower edge raised and well marked, upper edge less diffused, semi-solid in consistency, situated 7½ inches above the point of the elbow, on the right ribs. Temp. A.M. 37·8° C., P. 28, R. 11; P.M. 38·5° C., P. 40, R. 14.

18th.—Plaques Nos. 5 and 11 have disappeared. Nos. 4 and 12 persist, while Nos. 6, 7, 8, 9, and 10 have decreased in dimensions. Temp. A.M. 37·9° C., P. 28, R. 12; P.M. 38·3° C., P. 40, R. 16.

19th.—Plaques Nos. 5, 8, 9, 10 (*b*) and (*c*) have disappeared, Nos. 4 and 7 have decreased, and No. 6 is stationary. No. 10 (*d*) is slightly visible, while No. 12 has increased in size and is more prominent, still retaining its pitted centre and well marked border. 1 P.M. No. 13 (urticarial) has appeared on the under-surface of abdomen to the right of the linea alba. It is circular, 1½ inches in diameter, pitted in the centre and somewhat soft to the touch. Temp. A.M. 37·9° C., P. 36, R. 12; P.M. 38·0° C, P. 35, R. 12.

20th.—Plaque No. 4 has disappeared. Nos. 6. and 10 (*d*) have increased in size to 1¼ and 1½ inches in diameter respectively. Nos. 7 and 13 have remained stationary, and No. 12 has decreased in size. Temp. A.M. 37·9° C., P. 40, R. 13; P.M. 38·3° C., P. 44, R. 18

21st.—Plaques Nos. 10 (*d*) and 13 have increased in diameter to 2 and 2 inches respectively. Nos. 6 and 7 have remained stationary, while No. 12 has decreased and now only thickening remains. The right foreleg is somewhat swollen owing to slight traumatic injury. Temp. A.M. 39·0° C., P. 56, R. 18; P.M. 39 4° C., P. 52, R. 16.

22nd.—Plaques Nos. 10 (*d*) and 13 have again increased 2 to 2¼ and 2½ inches in diameter respectively, while Nos. 6, 7, and the thickening at the site of No. 12 have remained stationary. The submaxillary glands are slightly enlarged. Temp. A.M. 38·0° C., P. 40, R. 15; P.M. 38·5° C., P. 40, R. 16.

23rd.—The thickening at the site of plaque No. 12 disappeared in the night and No. 4 reappeared. Nos. 6, 7, 10 (*d*) and 13 have all increased in dimensions, the measurements and chief characteristics noted being respectively 2½″ × 2″ (hard); 3″ × 1¾″ circular pitted in centre; 3¼″ × 3″ raised with well marked edge; 2¼″ × 2″ well marked, semi-solid in consistency. Temp. A.M. 37·6° C., P. 36, R. 14; P.M. 38·0° C., P. 36, R. 13.

24th.—Condition of plaques is as follows: No. 6 increased now measures 3½″ × 3″ well raised. No. 7 increased now measures 3½ inches in diameter. No. 10 (*d*) persists and 10(*c*) has reappeared as a small circular soft plaque ½ inch in diameter, while No. 13 has decreased to 2½ inches in diameter. Temp. A.M. 37·6° C., P. 34, R. 12; P.M. 37·8° C., P. 36, R. 13.

25th.—Plaques Nos. 6 and 7 have decreased. No. 10 (*c*) has increased to 1 inch in diameter, 10 (*d*) is stationary, while No. 13 is less prominent. A fresh plaque No. 14 (urticarial) appeared on the right hip ¾ inch in diameter, well raised; this plaque has two smaller ones near it. Two small urticarial spots have also appeared on the right shoulder. Temp. A.M. 37·8° C., P. 36, R. 12; P.M. 38·0° C., P. 34, R. 12.

26th.—Plaques Nos. 6, 7, and 13 have decreased in size and 10 (*d*) is flatter than previously. Plaque No. 10 (*c*) has increased to 1·5 inches in diameter and has assumed an urticarial form. No. 14 has increased to 1·5 inches in diameter and is slightly pitted in the centre. The small spots on the right hip persist. Of the two spots on the right shoulder, one persists and the other has decreased in size. Two fresh plaques Nos. 15 and 16 have appeared on the R. ribs. No. 15, 3″ × 1·5″ is oval in form, while No. 16 (urticarial) is 0·5 in diameter and is 1·5 inches below No. 15. Temp. A.M. 37·8° C., P. 40, R. 13 ; P.M. 38·0° C., P. 40, R. 14.

27th.—Plaque No. 13 has disappeared. The two spots on the right hip have become further developed, and have now assumed the form of urticarial plaques Nos. 17 and 18 ; further the spot on the right shoulder has also become a plaque No. 19, and all the above have diameters of about 1 inch. Plaque No. 8 has reappeared. Nos. 6 and 7 have decreased in size and No. 10 (*d*) in prominence, while Nos. 10 (*c*), 14, 15, 16, persist. The swelling and œdema of the vulva has increased somewhat since last noted. Temp. A.M. 37·6° C., P. 36, R. 12 ; P.M. 38·0° C., P. 44, R. 16.

28th.—Plaques Nos. 6, 7, 8, 10 (*d*), 14, 15, 16, 17, and 18 have all decreased in size during the night, but Nos. 10 (*c*) and 19 remain stationary. Swelling of vulva persists. Temp. A.M. 37·7° C., P. 40, R. 12 ; P.M. 38·3° C., P. 38, R. 12.

29th.—Plaque No. 10 (*c*) has increased in size now measuring 3 inches in diameter, No. 10 (*d*) is less prominent, Nos. 6, 7, 8, 15, and 16 have decreased in size, while Nos. 17, 18, and 19 persist. Temp. A.M. 37·8° C., P. 32, R. 12 ; P.M. 38·1° C., P. 40, R. 14.

30th.—Plaques Nos. 7 and 8 have disappeared, Nos. 10 (*c*) and 17 have increased in size, Nos. 10 (*d*), 6, 15, and 18 have decreased, and Nos. 14, 16, and 19 remain stationary. Temp. A.M. 37·8° C., P. 36, R. 14 ; P.M. 39·2° C., P. 48, R. 16.

July 1st.—All plaques have decreased during the past 24 hours, *viz.*, Nos. 10 (*c*) and (*d*), 6, 14, 15, 16, 17, 18, and 19. Temp. A.M. 39·2° C., P. 44, R. 14 ; A.M. 40·7° C., P. 52, R. 18.

2nd.—Plaques Nos. 15 and 18 have reappeared. No. 16 has become flattened, but has increased in size, diameter 2·5 inches. The raised hairs alone now indicate the position occupied by No. 6. Plaques Nos. 10 (*c*) and (*d*) and 19 have decreased. Temp. A.M. 38·7° C., P. 40, R. 12; P.M. 39·4° C., P. 40, R. 13.

3rd.—Plaque No. 10 (*d*) has disappeared, Nos. 6, 14, 16, 17, and 19 have decreased in size. No. 8 has increased and is now well defined, having raised edges which are hard to the touch. Temp. A.M. 38·8° C., P. 40, R. 12 ; P.M. 38·6° C., P. 48, R. 16.

4th.—During the past 24 hours symptoms have developed. Plaque No. 10 (*c*) half of the circular patch has disappeared, half persists. Plaque No. 5 has reappeared, is now pitted in the centre, and measures 4″ × 3½″ ; No. 6 has increased generally, while Nos. 19 and 8 are more prominent and the latter has assumed the urticarial form. No. 16 is flatter but covers a larger area, 2 inches in diameter and two plaques Nos. 14 and 17 have decreased. Six fresh plaques have appeared. No. 20 right side of withers 1·25 inches diameter, Nos. 21 and 22 on the right ribs small urticarial in character. No. 23 on R. side of the root of the tail, 0·5 inch diameter. No. 24 on the right flank, 1·5″ × 1″ diameter, oval, well raised, with well-defined edges. No. 25 on R. ribs 2 inches in diameter slightly raised. A few minute petechiæ have appeared on the m. m. of the vagina (photo). Temp. A.M. 38·1° C., P. 44, R. 12 ; P.M. 39·7° C., P. 52, R. 32.

5th.—Plaques Nos. 10 (*c*), 14, and 17 have disappeared, Nos. 5, 6, 8, 19, 23, and 25 have decreased, Nos. 20, 21, and 22 persist, while No. 24 has become raised and more prominent. The swelling of the vulva has decreased, but the œdema and vaginal petechiæ have remained stationary. During the time the evening temperature was being taken the animal allowed all the weight of the body to be more or less supported by the off hind limb. Temp. A.M. 38·6° C., P. 40, R. 16; P.M. 38·9° C., P. 44, R. 20.

6th.—Plaque No. 22 has increased in size 1·5 inches in diameter, Nos. 6, 19, and 21 have decreased, while Nos. 5, 8, 20, 23, and 24 remain as before. The swelling and œdema of the external genital organs has enormously increased, extending over the perinæum and partially involving the udder. The vaginal petechiæ are fading (photograph). Temp. A.M. 39·0° C., P. 42, R. 16; P.M. 39·4° C., P. 44, R. 18.

7th.—Plaque No. 6 has disappeared. Nos. 5, 8, 19, and 22 have decreased, while Nos. 20, 21, and 23 have remained stationary. Plaque No. 24 has increased to 2·5 inches in diameter. The swelling and œdema involving the perinæum, etc., has increased during the past 24 hours. Temp. A.M. 37·3° C., P. 36, R. 16; P.M. 38·4° C., P. 38, R. 20.

8th.—Plaques Nos. 5, 8, 19, 22, and 24 have decreased in size. No. 20 has increased and now measures 2 inches in diameter and No. 21 2·5 inches in diameter, No. 23 persists. The swelling and œdema of the external genitals has decreased. Temp. A.M. 37·4 C., P. 38, R. 14; P.M. 38·1° C., P. 43, R. 22.

9th.—Plaque No. 22 has disappeared, and Nos. 5 and 8 have decreased in size. Nos. 20 and 21 are more prominent, the latter measuring 2·25 in diameter, while Nos. 19, 23, and 24 have remained stationary. The swelling and œdema of the external genitals and perinæum is steadily decreasing. Temp. A.M. 37·6° C., P. 40, R. 16; P.M. 38·1° C., P. 36, R. 30.

10th.—Plaques Nos. 5 and 24 have disappeared and Nos. 8 and 19 have decreased in size. Plaque No. 1 has appeared a third time and is now raised and has a diameter 1½ inches. Nos. 20, 23, and 25 have increased in size, the first and last measuring 1·5 and 2·5 inches in diameter respectively. The swelling and œdema have disappeared from the perinæum, but the enlargement of the external genitals persists. Temp. A.M. 37·6° C., P. 40, R. 12; P.M. 37·9° C., P. 40, R. 18.

11th.—Plaque No. 19 has disappeared. Nos. 1 and 20 have increased in size, the former measuring 2″ × 1⅛″ and the latter 2 inches in diameter, well raised and soft; swelling of labia persists. The animal drags both hind limbs when walking. Temp. A.M. 37·6° C., P. 36, R. 14; P.M. 38·0° C., P. 42, R. 14.

12th.—Plaque No. 1, which appeared for the third time, has increased and now measures 3″ × 1·75″ and is well raised above the surrounding skin. Swelling of labia persists. Temp. A.M. 37·4° C., P. 38, R. 18; P.M. 37·3° C., P. 38, R. 17.

13th.—Plaque No. 8 has decreased in size, but Nos. 1, 20, 23, and 25 have remained stationary. Swelling decreased. Temp. A.M. 37·4° C., P. 30, R. 16; P.M. 38·1° C., P. 40, R. 16.

14th.—During the night plaques Nos. 15 and 16 reappeared, the borders of which are slightly raised; No. 8 disappeared; Nos. 1 and 23 increased in size and became pitted in their centres, the plaques measuring 3·25″ × 2″ and 2 inches respectively. No. 20 in the form of a half circle and No. 25 with raised hair to mark its position have decreased. At 9-30 A.M. 3 fresh plaques appeared—No. 26 on the left ribs, urticarial, ¾ inch in diameter; No. 37 over the left hip ½ inch in diameter, pitted in the centre; No. 28 on the right flank 0·5 inch in diameter, small and presenting urticarial characteristics. Swelling of the labia has increased, they now remain patent. Temp. A.M. 37·9° C., P. 41, R. 16; P.M. 38·1° C., P. 40, R. 23.

15th.—A fresh raised plaque No. 29 has appeared on the L. flank, circular in form, urticarial in character, diameter 0·75 inch. Nos. 1, 20, 15, 16, 26 have decreased in size, while Nos. 23, 27, and 28 persist. Swelling of left labium has increased. Temp. A.M. 37·8° C., P. 40, R. 16; P.M. 38·1° C., P. 44, R. 22.

16th.—The skin over the site occupied by plaque No. 25 continues to remain erect, although no signs of the latter's reappearance can be observed. Plaques Nos. 1 and 20 have decreased, while Nos. 15, 16, 26, 27, and 29 remain stationary with regard to size. Nos. 23 and 28 have increased in prominence, the latter now measures 2·5″ × 2·5″ and has become pitted in the centre. The swelling of the L. labium persists, but is tense and hard to the touch. The swelling and œdema of the udder has reappeared. Temp. A.M. 37·9° C., P. 36, R. 12; P.M. 38·2° C., P. 40, R. 16.

17th.—Plaques Nos. 1, 20, and 26 have disappeared, while Nos. 15, 16, 25, 27, and 28 remain as before as regards size. Nos 23 and 29 have increased in dimensions, the former to 4 × 2·5 inches, the latter which has become pitted in the centre to 2 inches. A fresh plaque No. 30 (urticarial) which has appeared on the R. side of the linea alba, 0·5 inch in diameter, is semi-solid in consistency. The swelling of the L. labium and swelling and œdema of the udder persist. Temp. A.M. 37·9° C., P. 36, R. 13; P.M. 38·1° C., P. 40, R. 16.

18th.—Plaques Nos. 1, 25, and 30 have disappeared, Nos. 15, 16, 23, 28, and 29 remain stationary, while Nos. 20, 26, and 27 have decreased in size. A fresh plaque No. 31 (urticarial) semi-lunar in form has appeared on the R. flank measuring 3″ × 1·25″. The swelling and œdema of the udder has increased since yesterday. Temp. A.M. 38·0° C., P. 40, R. 15; P.M. 38·1° C., P. 44, R. 14.

19th.—Plaque No. 29 has disappeared, Nos. 20 and 28 have decreased, while the following have all increased in size and have become more prominent. No. 28 is well marked but soft. No. 27 now measures 2·5 × 1 inch, while No. 31 is markedly raised. The swelling and œdema of the udder, as well as the size of the left labium, have decreased. A muco-purulent discharge from the vagina has appeared during the past 12 hours (photo.). Temp. A.M. 37·5° C., P. 40, R. 15; P.M. 37·8° C., P. 40, R. 16.

20th.—Plaque No. 20 has disappeared, Nos. 15, 16, and 23 have decreased in size, while Nos. 26, 27, 28, and 31 persist. The swelling and œdema of the udder, which feels hot to the hand, remains stationary. Temp. A.M. 38·1° C., P. 44, R. 15; P.M. 38·0° C., P. 44, R. 16.

21st.—Three fresh plaques have appeared, No. 32 on R. ribs, circular in form, 1·25 inches in diameter, presents a well raised margin, with pitted centre.

No. 33 (urticarial) on R. side of neck, is slightly raised and hard, 0·75 inch in diameter. No. 34 on R. ribs, 1·50 inches in diameter, slightly raised, pitted in centre. Nos. 25 and 30 have appeared, the former on R. ribs, and the latter, 1·5 inches in diameter, well raised but soft, pitted in the centre, is situated a little lower than No. 30. The condition of the left labium and udder is the same as yesterday. Temp. A.M. 38·1° C., P. 40, R. 15 ; P.M. 38·0° C., P. 48, R. 13.

22nd.—A fresh plaque No. 35 appeared on the left hip, fairly raised and 1 inch in diameter. Nos. 27, 30, 31, 32, and 34 have increased, the former in general dimensions, all the latter in prominence. Plaques Nos. 15, 16, 25, and 33 have decreased and Nos. 23, 26, and 28 persist. Temp. A.M. 38·0° C., P. 52, R. 14 ; P.M. 38·1° C., P. 36, R. 18.

23rd.—Plaque No. 15 disappeared, Nos. 16, 23, 29, 33, and 35 have decreased, while Nos. 25, 26, 27, 28, 30, 31, 32, and 34 have remained stationary as regards their size. Temp. A.M. 38·3° C., P. 48, R. 14 ; P.M. 38·7° C., P. 44, R. 13.

24th.—The following changes have taken place since yesterday in the condition of the plaques respectively. No. 33 has disappeared, No. 34 has become more prominent, while No. 26 has increased in extent. Nos. 23, 25, 27, 29, and 35 have decreased, but Nos. 16, 28, 30, 31, and 32 have remained stationary in size. During the past three days the condition of the left labium and udder have remained unchanged. Temp. A.M. 38·1° C., P. 40, R. 14 ; P.M. 38·5° C., P. 42, R. 13.

25th.—Plaque No. 28 has decreased, but No. 34 has increased and now measures 3·5 × 2·5 inches, and is pitted in the centre. The other Nos. 25, 26, 27, 29, 30, 31, 32, and 35 persist. Both labia are now involved and have considerably increased in size. The œdema of the udder has decreased in extent. Temp. A.M. 38·1° C., P. 40, R. 13 ; P.M. 38·0° C., P. 44, R. 12.

26th.—Three fresh plaques have appeared. Nos. 36 and 37 on the left hip near to No. 35, the former is slightly raised, semi-circular in form, 2 inches in diameter, No. 37 circular, slightly raised, 1·5 inches in diameter, No. 38 on left side of chest is 2·5 inches in diameter. Also a small, hard lump has appeared close under the position occupied by No. 34. With regard to the other plaques No. 28 has disappeared, No 34 has increased and now measures 5 × 3 inches, Nos. 16, 23, and 27 have decreased, while Nos. 25, 26, 29, 30, 31, 32, and 35 persist. The swelling of the labia has increased, that of the udder remains unchanged. Temp. A.M. 37·4° C., P. 41, R. 14 ; P.M. 37·8° C., P. 40, R. 15.

27th.—Plaque No. 23 has disappeared, Nos. 25, 26, 27, 29, 31, 32, 35, 36, and 37 have decreased in size. No. 30 has increased and measures 2·5 inches in diameter. Nos. 34, 38 and part of No. 16 persist. Temp. A.M. 37·3° C., P. 36, R. 14 ; P.M. 38·3° C., P. 40, R. 14.

28th.—Plaques Nos. 25, 27, and 31 have disappeared and Nos. 29, 32, 34, 35, 36, 37, and 38 have decreased during the past 24 hours, while Nos. 16 (half), 26, and 30 persist. The animal appears to be generally lame this morning, both hind and the off-fore legs being affected. Temp. A.M. 38·3° C., P. 42, R. 16; P.M. 38·0° C., P. 42, R. 14.

29th.—Two fresh plaques have appeared. No. 39 on the R. ribs near to No. 16 is 1·5 inches in diameter and pitted in the centre. No. 40 situated under the angle of the ileum is 1·25 inches in diameter and is also pitted in the centre. No. 37 plaque disappeared in the night, and Nos. 29, 30, 32, 34, 35, and 36 have decreased in size, but Nos. 16 and 38 remain as before. A few groups of petechiæ have appeared on the vaginal m. m. Temp. A.M. 38·0° C., P. 42, R. 16; P.M. 38·2° C., P. 48, R. 14.

30th.—One fresh plaque has appeared on the right hip, is 1·5 inches in diameter and slightly raised. No. 39 is more prominent than before and Nos. 32, 34, 35, and 36 have decreased in size, but Nos. 16, 29, 30, 38, and 40 persist. The groups of petechiæ on the vaginal m. m. have not altered since observed yesterday. Temp. A.M. 37·6° C., P. 44, R. 16; P.M. 37·7° C., P. 42, R. 14.

31st.—Six new plaques have appeared since yesterday morning.

No. 42 on R. ribs, 1·5 inch diameter, circumference of plaque raised, and pitted in the centre.

No. 43 on R. shoulder 1·0 in diameter, circumference of plaque raised, pitted in the centre.

No. 44 on R. ribs 0·5 inch diameter, circumference raised, but plaque not pitted.

No. 45 on seat of No. 10 (c) 2·0 inches diameter.

No. 46 on L. ribs, oval in shape, pitted in the centre measuring 4·5 × 2·5 inches.

No. 47 small lumps on the L. ribs, one or both of which will assume plaque form later. Plaques Nos. 34, 35, and 36 disappeared in the night. Nos. 29, 30, 32, and 40 decreased, No. 41 has become more prominent, and Nos. 16 and 39 persist. The animal is lame on both hind limbs and also on the off-fore. The swelling of the labia has decreased, but that of the udder has increased towards the front of the gland. Temp. A.M. 38·0° C., P. 42, R. 18; P.M. 38·1° C., P. 44, R. 16.

1st August.—Plaque No. 32 appeared, and No. 35 reappeared, while Nos. 43 and 44 increased in diameter 1·5 and 1·0 inches respectively, Nos. 29 and 30 decreased in size, and Nos. 16, 38, 39, 40, 41, 42, 45, 46, and 47 persist. The swelling and œdema of the udder and in front on the under-surface of the abdomen have remained stationary. Temp. A.M. 38° C., P. 40, R. 14; P.M. 38·1° C., P. 42, R. 18.

2nd.—Plaques Nos. 41 and 45 have increased in size and Nos. 29, 30, 35, 38, 39, 40, 43, and 44 have decreased, while Nos. 16, 46, and 47 persist. Temp. A.M. 38·0° C., P. 40, R. 14; P.M. 38·1° C., P. 42, R. 18.

3rd.—All the before mentioned plaques as mentioned yesterday have decreased in size with the exception of No. 41, which has retained its former dimensions. The near hind fetlock is increased in size and the lameness evidently is due to that cause. Temp. A.M. 38·6° C., P. 40, R. 16; P.M. 38·8° C., P. 46, R. 28.

4th.—The following plaques have disappeared: Nos. 29, 35, and 40; and Nos. 39 and 42 have increased in size, the latter measuring 3 inches in diameter with pitted centre. Nos. 30 and 43 to 46 have decreased, while Nos. 16, 38, and 47 persist. The swelling of the external genitals and udder which had for several days remained stationary have now increased. Œdematous swelling under the abdomen. Temp. A.M. 38·2° C., P. 38, R. 14; P.M. 38·5° C., P. 42, R. 20.

5th.—Plaque No. 45 has increased in size and become pitted in the centre; it now measures 4 × 3 inches. Nos. 43, 46, and 47 have decreased, and Nos. 16, 30, 39, 41, 42, 44, and 38 persist. Swelling of external genitals and udder remains stationary. Temp. A.M. 37·8° C., P. 40, R. 15; P.M. 38·1° C., P. 42, R. 16.

6th.—Plaque No. 38 and the upper of the two small lumps forming No. 47 has disappeared, while the lower one has developed into a separate pitted plaque. No. 45 has increased in size 5 × 3 inches, Nos 16, 41 to 44 inclusive persist, while Nos. 30, 39, and 46 have decreased. Temp. A.M. 37·9° C., P. 36, R. 18; P.M. 38·5° C., P. 42, R. 16.

7th.—A fresh plaque No. 48 has appeared on the L. ribs measuring 6 × 2 inches, irregular in shape and somewhat raised above the level of the surrounding tissues. Nos. 30, 39, and 46 have disappeared, Nos. 43, 44, and 47 have decreased, and Nos. 16, 41, 42, and 45 persist. Temp. A.M. 37·9 °C., P. 36, R. 12; P.M. 38·3° C., P. 40, R. 14.

8th.—A fresh plaque No. 49 has appeared on the R. flank 2 × 1 inches, kidney-shaped and very slightly raised. No. 38 has reappeared, and No. 16 has increased in size and become pitted in the centre, measuring 2 × 1·5 inches. Nos. 43, 45, and 48 have decreased, and Nos. 41, 42, and 44 persist. Temp. A.M. 37·9° C., P. 36, R. 18; P.M. 37·9° C., P. 38, R. 14.

9th.—A fresh plaque No. 50 has appeared on the R. hip, circular, 1 inch in diameter, pitted in the centre and slightly raised. During the night Nos. 43, 44, and 48 have disappeared, Nos. 38, 41, 45, and 49 have decreased, while Nos. 16 and 42 persist. The swelling of the external genital organs has remained stationary for the past 4 days, but the œdema of udder and under abdomen have decreased during the past 24 hours. Temp. A.M. 37 8° C., P. 38, R. 14; P.M. 38·0° C., P. 44, R. 16.

10th.—During the last twelve hours four fresh plaques have appeared, Nos. 51 (urticarial) on the R. point of the shoulder, circular, 1 inch in diameter and fairly raised. No. 52 on the R. side of the neck, kidney-shaped, somewhat raised, 1·25 × 0·5 inches in diameter. No. 53 on R. side of abdomen raised, circular, about 3 inches in diameter. No. 54 on left side of anus. No. 41 is decreasing in size, but Nos. 16, 42, and 50 remain unaltered. The œdema on the under-surface of the abdomen has been absorbed, but the œdema of udder persists. Temp. A.M. 38·0° C., P. 40, R. 16; P.M. 37·9 C., P. 42, R. 14.

11th.—Plaques Nos. 50 and 51 have disappeared, Nos. 41 and 53 have decreased, while Nos. 16, 42, 52, and 54 persist. Temp. A.M. 37·9° C., P. 42, R. 16; P.M. 38·2°C., P. 42, R. 14.

12th.—Since last evening a fresh plaque No. 55 has made its appearance on the R. flank, circular in form, 1 inch in diameter, pitted in the centre and slightly raised. During the same period No. 41 has disappeared, but Nos. 16, 42, 52, 53, and 54 remain unaltered. Temp. A.M. 37·6°C., P. 44, R. 18; P.M. 37·9° C., P. 44, R. 20.

13th.—A fresh plaque No. 56 has appeared on the R. side of the anus 5 × 3 inches, raised somewhat above the surrounding tissues. Nos. 53 and 55 have disappeared, but Nos. 16, 42, 52, and 54 persist. Temp. A.M. 37·8° C., P. 46, R. 18; P.M. 38·2° C., P. 48, R. 18.

14th.—On the L. scapular spine an oval, slightly raised plaque has appeared 1×0·5 inches in measurement, which is slightly raised. This is No. 57. Nos. 54 and 56 have become smaller, but Nos. 16, 42, and 52 persist. Temp. A.M. 38·3° C., P. 40, R. 16; P.M. 38·6° C., P. 48, R. 16.

15th.—Three plaques Nos. 52, 54, and 56 have disappeared during the past 15 hours and Nos. 16, 42, and 57 have decreased in size. Temp. A.M. 39·7° C., P. 50, R. 16; P.M. 39·6° C., P. 50, R. 16.

16th.—Plaques Nos. 16, 42, and 57 have disappeared, and No. 50 has reappeared, together with a circumscribed swelling measuring 5×4×0·75 inches on the internal surface of the right thigh. The swelling and œdema of the labia and udder have remained quite stationary for the past four days. Temp. A.M. 38·0° C, P. 40, R. 11; P.M. 38·4° C., P. 40, R. 18.

17th.—This morning plaque No. 50 is more prominent than yesterday, and the hair over No. 16 stands erect. A few purple coloured petechiæ have appeared on the m. m. of the vagina near to the outlet. Temp. A.M. 38·2° C., P. 38, R. 14; P.M. 37·8° C., P. 42, R. 16.

18th.—Two new plaques have appeared, Nos. 58 and 59, the former on the R. flank circular in form, 1·5 inches in diameter, is well raised, the latter on the R. flank also is urticarial in character, circular, and 0·75 inches in diameter. The hair still remains erect over the seat of No. 16, and No. 50 persists. The vaginal petechiæ have now changed to a light yellow colour, but have not decreased in size or shape. Temp. A.M. 37·8° C., P. 40, R. 14; P.M. 38·0° C., P. 40, R. 18.

19th.—Plaque No. 59 has increased in size, No. 50 has decreased, but No. 58 remains as before noted. Temp. A.M. 37·9° C., P. 36, R. 14; P.M. 38·1° C., P. 38, R. 18.

20th.—Plaques Nos. 50, 58, and 59 remain in the same condition as yesterday. Temp. A.M. 37·7° C., P. 38, R. 14; P.M. 36·9° C., P. 40, R. 14.

21st.—Plaques Nos. 50, 58, and 59 have remained in the same condition during the past three days. Temp. A.M. 37·7° C., P. 40, R. 16; P.M. 37·5° C, P. 40, R. 16.

22nd.—One of the three plaques, No. 50, has decreased in size, but there is no alteration to note in the other two Nos. 58 and 59. Temp. A.M. 37·5° C., P. 40, R. 16; P.M. 37·7° C., P. 48, R. 15.

23rd.—Plaques Nos. 50 and 58 have decreased, but No. 59 persists. The swelling of the labia has decreased, but the condition of the udder is unchanged. Temp. A.M. 37·5° C., P. 36, R. 12; P.M. 37·7° C., P. 40, R. 14.

24th.—Plaque No 59 has increased and become pitted in the centre; it now measures 2·5×1·5 inches. Nos. 50 and 58 have disappeared. Temp. A.M. 37·6° C., P. 36, R. 16; P.M. 37·6° C., P. 48, R. 16.

25th.—A fresh plaque No. 60 has appeared on the right abdomen, circular in form, 1 inch in diameter and well raised above the surrounding tissues. No. 59 has decreased in size. As the swelling decreases, the labia vaginæ have a tendency to remain apart, so the passage remains patent. Temp. A.M. 37·8° C., P. 42, R. 16; P.M. 37·5° C., P. 44, R. 16.

26th.—During the past twenty-four hours No. 60 plaque has become more Prominent, but No. 59 persists. Temp. A.M. 37·6° C., P. 40, R. 16 ; P.M. 38·2° C., P. 44, R. 16.

27th.—Three fresh plaques have appeared, No. 61 (urticarial) close to No. 30 on the R. side of abdomen, 0·25 inch in diameter. Nos. 62 and 63 are similarly situated in juxta-position to No. 60 and are all about the same dimensions. Temp. A.M. 37·7° C., P. 40, R. 16 ; P.M. 38·2° C., P. 48, R. 15.

28th.—The four plaques Nos. 59, 60, 61, and 62 retain their former shape and size. The swelling of the external genitals has increased. Temperature A.M. 38·4° C., P. 40, R. 16 ; P.M. 38·2° C., P. 46, R. 16.

29th.—Plaques Nos. 60, 61, and 62 have decreased in size, but No. 59 persists. The swelling of the labia has now extended to the tissues around the anus, and downwards into the perinæum. Temp. A.M. 38·1° C., P. 40, R. 13 ; P.M. 38·2° C., P. 44, R. 14.

30th.—Plaque No. 61 has disappeared, while Nos. 59, 62, and 63 have decreased, but No. 60 has increased in size and now measures 3 inches in diameter. The swelling and œdema of the perinæum has decreased somewhat during the past 24 hours. Temp. A.M. 37·8° C., P. 40, R. 16 ; P.M. 8·0° C., P. 38, R. 14.

31st.—Plaque No. 60 has become more prominent and pitted in the centre, while a small projection has formed from the inferior edge, as if the plaque had budded. No. 59 has disappeared. Two fresh plaques have appeared, Nos. 64 and 65, which have more or less occupied the positions previously occupied by Nos. 8 and 29 on the left hip, which latter disappeared on the 15th June and 19th July, respectively. Nos. 64 and 65 are small, circular in form, and both have pitted centres. No. 66 appeared on the left flank, circular, 4 inches in diameter, but only the hair at the circumference is raised. No. 67, which appeared on the left side of the chest, is also circular, 2 inches in diameter, only one portion of the circumference is raised, while the other portion is on a level with the surrounding tissues. Temp. A.M. 37·7° C., P. 38, R. 15 ; P.M. 37·9° C., P. 42, R. 16.

1st September.—Plaque No. 67 has decreased in size, but Nos. 60, 64, 65, and 66 remain as before noted. The œdema has disappeared from the perinæum, but that of the labia and udder persists. Temp. A.M. 37·8° C., P. 38, R. 12 ; P.M. 37·6° C., P. 40, R. 16.

2nd.—Plaques Nos. 64, 65, 66, and 67 have decreased in size, but No. 60 remains unaltered. The swelling and œdema of the tissues of the anus and labia have decreased, but that of the udder persists. Temp. A.M. 37·6° C., P. 38, R. 14 ; P.M. 38·0° C., P. 40, R. 16.

3rd.—A fresh plaque No. 68 has appeared on the right side of the ribs ; it is hard in consistency, with a raised centre measuring 2·5 × 2 inches. The œdema of udder persists, and that in the other situations has decreased. Temp. A.M. 37·8° C., P. 36, R. 13 ; P. M. 38·0°C., P. 40, R. 16.

4th.—The prominence of plaque No. 68 is more marked, while Nos. 60, 64, and 65 have decreased. Nos. 66 and 67 remain unaltered. The swelling and œdema of the parts persist. Temp. A.M. 38·1° C., P. 38, R. 12 ; P.M. 38·3° C., P. 40, R. 14.

5th.—The size of No. 60 has diminished, but that of Nos. 64, 65, 66, 67, and 68 persists. Temp. A.M. 38·0° C., P. 40, R. 12; P.M. 38·9° C., P. 44, R. 16.

6th.—All the plaques now present have decreased in size during the past 24 hours, but the swelling and œdema of the udder is increasing. Temp. A.M. 38·4° C., P. 36, R. 14; P.M. 38·5° C., P. 44, R. 16.

7th.—The same remarks as noted yesterday hold good for the past 24 hours. Temp. A.M. 38·1° C., P. 48, R. 17; P.M. 38·3° C., P. 34, R. 17.

8th.—Plaques Nos. 60 and 64 have disappeared, and Nos. 65 to 68 inclusive have decreased. Swelling and œdema persist. Temp. A.M. 38·1° C., P. 36, R. 13; P.M. 38·3° C., P. 36, R. 14.

9th.—Plaques Nos. 66 and 67 have disappeared, but Nos. 65 and 68 persist. Temp. A.M. 38·3° C., P. 38, R. 13; P.M. 38·3° C., P. 40, R. 16.

10th.—Plaques Nos. 65 and 68 remain stationary in dimensions, and the swelling and œdema before noted is unaltered. Temp. A.M. 38·6° C., P. 40, R. 12; P.M. 38·4° C., P. 40, R. 16.

11th.—Both plaques have decreased in size. Swelling and œdema is unaltered. Temp. A.M. 38·5° C., P. 44, R. 16; P.M. 38·5° C., P. 42, R. 12.

12th.—Both plaques Nos. 65 and 68 have disappeared. Temp. A.M. 38·5° C., P. 40, R. 12; P.M. 38·3° C., P. 38, R. 13.

13th.—A fresh plaque No. 69 has appeared on the right hip, circular, 1 inch in diameter and slightly raised. Temp. A.M. 38·2° C., P. 36, R. 12; P.M. 38·6° C., P. 36, R. 15.

14th.—A fresh plaque No. 70 has appeared on the R. hip circular, pitted in the centre, 0·75 inch in diameter; a second fresh one No. 71 on the R. ribs, measuring 2·5×2 inches, is pitted and somewhat raised. The dimensions of No. 69 remain unaltered. Temp. A.M. 38·2° C., P. 36, R. 12; P.M. 38·6° C. P. 36, R. 15.

15th.—Plaque No. 69 and the posterior portion of No. 71 persist, while No. 70 and the front portion of No. 71 have decreased in size. Temp. A.M. 38·4° C., P. 40, R. 14; P.M. 38·9° C., P. 42, R. 14.

16th.—The front portion of plaques No. 71 and No. 70 have decreased, while the posterior portion and No. 69 still remain unaltered. Temp. A.M. 39·1° C., P. 44, R. 14; P.M. 39·1° C., P. 40, R. 14.

17th.—The following plaques have decreased in dimensions during the past 24 hours, *viz.*, Nos. 69, 70, and the posterior portion of No. 71. A fresh plaque No. 72 has appeared on the right side of the neck below the crest, triangular in form, each side is about 1 inch in length. Temp. A.M. 39·0° C., P. 37, R. 19; P.M. 39·3° C., P 42, R. 16.

18th.—The front portion of No. 71 has disappeared, while the posterior portion and No. 72 persist. Nos. 69 and 70 have decreased in size. Temp. A.M. 38·6° C., P. 40, R. 12; P.M. 39·3° C., P. 41, R. 14.

19th.—The posterior portion of plaques Nos. 71 and 72 remains stationary, but Nos. 69 and 70 have decreased in size. The left thigh behind the stifle joint is swollen and warm to the touch; there is some tenderness on pressure and the animal goes lame on the near hind limb. Temp. A.M. 39·6° C., P. 52, R. 20; P.M. 39·5° C., P. 46, R. 18.

20th.—There is swelling of the left hind limb from croup to hoop accompanied by lameness. The plaques have all remained unaltered in dimensions since last noted. Temp. A.M. 39·2° C., P. 34, R. 12; P.M. 39·5° C., P. 66, R. 50.

21st.—All the plaques have decreased in size during the past 24 hours with the exception of No. 72, which remains unaltered. The swelling of the left hind limb persists. Temp. A.M. 39·6° C., P. 50, R. 10; P.M. 39·2° C., P. 52, R. 20.

22nd.—Yesterday's note holds good for the animal's condition to-day. Temp. A.M. 38·1° C., P. 50, R. 18; P.M. 38·1° C., P. 42, R. 18.

23rd.—The animal's condition has remained unaltered since the 21st. Temp. A.M. 38·5° C., P. 38, R. 18; P.M. 38·4° C., P. 45, R. 16.

24th.—Two fresh plaques have appeared—No. 73 on the right buttock, irregular in form, 2×1 inches, and No. 74 on the right side of the chest, circular in shape, 1 inch in diameter. The posterior portion of No. 71, together with Nos. 72 and 70, have remained unaltered. Other symptoms persist. Temp. A.M. 38·5° C., P. 48, R. 16; P.M. 38·6° C., P. 50, R. 20.

25th.—The following three plaques have increased in size and become more prominent—Nos. 72, 69, and 70, whereas the posterior portion of No. 71 has decreased in size. Other symptoms persist. Temp. A.M. 38·4° C., P. 52, R. 18; P.M. 38·7° C., P. 60, R. 20.

26th.—The posterior half of plaque No. 71 and Nos 69, 70, 72, 73, and 74 remain unaltered. The swelling and œdema of the left hind limb has somewhat decreased, but that involving the labia and udder persists. Temp. A.M. 38·6° C., P. 50, R. 20; P.M. 38·9° C., P. 44, R. 20.

27th.—Condition unchanged, except that a swelling has appeared upon the point of the hook. Temp. A.M. 38·0° C., P. 36, R. 16; P.M. 38·6° C., P. 50, R. 18.

28th.—Two fresh plaques have appeared, No. 75 on right thigh below the seat of No. 73, 6 × 3 inches, raised. No. 76 flat on the right side of the root of the tail, 5·1 inches. No. 73 has changed its form and become circular in shape and less prominent; No. 71 has decreased in size, but Nos. 69, 70, and 74 persist. The swelling of the left hind limb remains stationary, but that of the labia and udder have decreased. Temp A.M. 37·9°C., P. 50, R. 14; P.M. 38·5°C., P. 44, R. 18.

29th.—Plaque No. 73 has become less prominent and the posterior portion of No. 71 has disappeared, but Nos. 69, 70, 74, 75, and 76 persist. The swelling of the left hind limb has remained unaltered, but that of the labia and udder have decreased. Temp. A.M. 38·0°C., P. 60, R. 16; P.M. 38·4°C., P. 40, R. 18.

30th.—Leucodermic patches have appeared on the udder, following the separation of certain film-like scabs, when the swelling and œdema of that part decreased, during the past 48 hours. Temp. A.M. 38·0° C., P. 60, R. 18; P.M. 38·4° C., P. 60, R. 18.

October 1st.—Plaque No. 74 has decreased, but Nos. 69, 70, 73, 75, and 76 remain unchanged. Temp. A.M. 37·9° C., P. 56, R. 18; P.M. 38·3° C., P. 56, R. 16.

2nd.—During the past 24 hours, all the plaques have become reduced in size, but the swelling and œdema of the different portions of the body implicated remains unaltered. Temp. A.M. 37·7° C., P. 64, R. 16; P.M. 37·8° C., P. 56, R. 18.

3rd.—Plaque No. 76 remains the same; all the others have decreased in dimensions during the night. Other symptoms as noted yesterday. Temp. A.M. 38·4° C., P. 52, R. 14; P.M. 38·8° C., P. 48, R. 14.

4th.—Two plaques Nos. 73 and 75 have disappeared; No. 74 has decreased, while Nos. 69, 70, and 76 persist. Temp. A.M. 38·2° C., P. 48, R. 14; P.M. 39·1° C., P. 50, R. 16.

5th.—Plaque No. 74 has disappeared. Nos. 69 and 70 have decreased in size, while No. 76 persists. The swelling of the left hind limb has increased in size, and an orange-coloured fluid escapes from the inner aspect. Temp. A.M. 38·5° C., P. 60, R. 16; P.M. 38·7° C., P. 40, R. 14.

6th.—All the three plaques remaining visible yesterday persist, and the other symptoms are unchanged. Temp. A.M. 38·5° C., P. 60, R. 18; P.M. 38·7° C., P. 44, R. 14.

7th.—Plaques Nos. 69 and 70 have decreased, while No. 76 persists. The left hind limb has increased in size, and the fluid continues to escape from a small wound on its inner aspect and the right is swollen throughout its whole length. Temp. A.M. 38·0° C., P. 48, R. 14; P.M. 38·4° C., P. 44, R. 14.

8th.—Plaques Nos. 69 and 70 have disappeared, No. 76 persists. The swelling of both hind limbs remains unaltered, except that orange-coloured fluid now escapes from small wounds on the outer and inner aspects of the left thigh. Temp. A.M. 38·1° C., P. 52, R. 16; P.M. 38·2° C., P. 46, R. 14.

9th.—A fresh plaque No. 77 has appeared on the left side of the chest on the 8th rib, nearly circular in form, 2 × 1·5 inches. No. 76 persists. The swelling of the left hind limb has decreased owing to the escape of lymph from wounds on both aspects of the thigh. The swelling of the right hind limb remains the same as yesterday. Mare horsing. Temp. A.M. 37·5° C., P. 50, R. 14; P.M. 37·8° C., P. 50, R. 16.

10th.—The condition of the animal has remained unchanged since yesterday. Plaques Nos. 76 and 77 persist. Temp. A.M. 37·5° C., P. 46, R. 18; P.M. 37·5° C., P. 48, R. 16.

11th.—A fresh plaque has appeared during the night, No. 78 on the right side of the abdomen in right lumbar region, 2 × 1 inches, and somewhat raised. Nos. 76 and 77 persist. The swelling of both hind limbs has decreased, fluid still escaping from both wounds. Swelling and œdema of udder has again appeared. Temp. A.M. 37·7° C., P. 44, R. 16; P.M. 37·8° C, P. 40, R. 16.

12th.—Plaques Nos. 76, 77, and 78 persist; swelling of both hind limbs has decreased. The swelling and œdema of udder remains unaltered. Temp. A.M. 37·6° C., P. 44, R. 14; P.M. 38·0° C., P. 44, R. 16.

13th.—A fresh plaque No. 79 has appeared on the left side of the chest, circular, 2 inches in diameter. Nos. 77 and 78 have increased in dimensions, while No. 76 has decreased. The condition of the hind limbs remains unaltered. Temp. A.M. 37·5° C., P. 36, R. 14; P.M. 37·8° C., P. 40, R. 16.

14th.—Another plaque No. 80 has appeared on the right side of the crest, circular in form, 2 inches in diameter and well raised above the surrounding structures. During the night, No. 76 disappeared, No. 79 increased in size, while Nos. 77 and 78 persist. The condition of the hind limbs and udder remains unchanged. Temp. A.M. 37·7° C., P. 40, R. 14; P.M. 37·8° C., P. 42, R. 14.

15th.—Plaques Nos. 71 and 74 reappeared, while Nos. 77 to 80 inclusive persist. The swelling of the right hind limb has become less, while that of the left remains stationary in size. Temp. A.M. 37·7° C., P. 40, R. 16; P.M. 38·2° C., P. 46, R. 16.

16th.—The following plaques Nos. 77, 79, and 80 have increased in dimensions—No. 78 has become reduced in size, while Nos. 71 and 74 persist. The swelling of both hind limbs has decreased, the wound on the inner surface of the left thigh is suppurating. Temp. A.M. 38·0° C., P. 30, R. 16; P.M. 38·0°C., P. 36, R. 16.

17th.—Plaques Nos. 71, 74, and 80 have increased in size and No. 79 has become more prominent, while No. 78 has decreased and No. 77 persists. The swelling and œdema of the udder has increased and is now spreading forward on the under-surface of the abdomen. The vaginal m. m. has become œdematous and protrudes through the labia which have remained patent for some time. Temp. A.M. 37·8° C., P. 36, R. 14; P.M. 38·0° C., P. 36, R. 14.

18th.—All the plaques remain stationary as regards dimensions and other characteristics. The swelling of the near hind limb is decreasing in size. Temp. A.M. 38° C., P. 40, R. 13; P.M. 38·2° C., P. 40, R. 14.

19th.—Several of the plaques Nos. 77 and 79 have increased, whilst others Nos. 71, 74, 78, and 80 have become smaller during the past 24 hours. The swelling and œdema of the udder and under-surface of the abdomen have remained unchanged. Temp. A.M. 37·7° C., P. 40, R. 12; P.M. 38·3° C., P. 44, R. 16.

20th.—The condition of the animal has remained unchanged since last noted, all the plaques persist. Temp. A.M. 37·5 °C., P. 40, R. 14; P.M. 38·1° C., P. 40, R. 16.

21st.—Two of the plaques Nos. 71 and 80 have decreased in size, while the others are stationary. The œdema on the under-surface of abdomen has decreased somewhat. Temp. A.M. 38·0°C., P. 36, R. 14; P.M. 37·9°C., P. 42, R. 12.

22nd.—During the night, two plaques Nos. 71 and 78 have disappeared and all the others have decreased in size. The œdema on the under-surface of the abdomen has still more decreased since yesterday. Wounds are doing well. Temp. A.M. 37·8° C., P. 32, R. 12; P.M. 37·8° C, P. 36, R. 14.

23rd.—All the plaques remaining have become reduced in size since last noted. Swelling and œdema less. Temp. A.M. 36·2° C., P. 38, R. 12; P.M. 38·2° C., P. 44, R. 12.

24th.—Plaque No. 79 has disappeared. Nos. 74 and 77 have decreased, but No. 80 remains unchanged. The swelling and œdema of udder and under-surface of abdomen persist. Temp. A.M. 37·4° C., P. 44, R. 17; P.M. 38·8° C., P. 36, R. 13.

25th.—The three remaining plaques have become reduced in size during the past 24 hours. The condition of the animal otherwise remains unchanged. Temp. A.M. 37·4° C., P. 44, R. 15; P.M. 37·8° C., P. 44, R. 12.

26th.—Plaques Nos. 74, 77, and 80 have become still smaller than yesterday but the other symptoms persist. Temp. A.M. 37·2°C., P. 32, R. 11; P.M. 38·3°C., P. 40, R. 13.

27th.—The plaques are gradually fading, otherwise symptoms are unchanged. Temp. A.M. 36·3°C., P. 32, R. 11; P.M. 38·0°C., P. 44, R. 16.

28th.—Plaque No. 77 has disappeared and Nos. 74 and 80 are the same as noted yesterday, other symptoms persist. Temp. A.M. 37·4°C., P. 36, R. 12; P.M. 38·5°C., P. 40, R. 12.

29th.—The condition of the animal is unchanged. Temp. A.M. 37·3°C., P. 40, R. 13; P.M. 37·9° C., P. 40, R. 14.

30th.—Plaque No. 74 disappeared, but No. 80 still persists. The swelling and œdema of the udder and under-surface of the abdomen have decreased, but the left hind limb has again increased in size. Temp. A.M. 37·7°C., P. 36, R. 13; P.M. 38·0°C., P. 40, R. 14.

31st.—A few small œdematous patches have appeared on the sides of the perinæum, but the swelling and œdema of the udder and under-surface of the abdomen have disappeared. Plaque No. 80 persists, other symptoms unchanged. Temp. A.M. 37·7°C., P. 32, R. 12; P.M. 38·4°C., P. 44, R. 12.

November 1st.—Plaque No. 80 has decreased in size, the patches of œdema on the sides of the perinæum have become smaller, but have reappeared on the udder. The swelling of the near hind limb has increased. Temp. A.M. 38·1°C., P. 44, R. 13; P.M. 39·5°C., P. 44, R. 14.

2nd.—The condition of the animal has remained unchanged during the past 24 hours. Temp. A.M. 39·0°C., P. 44, R. 12; P.M. 39·0°C., P. 60, R. 16.

3rd.—Plaque No. 80 still persists, as also the œdema of the udder. The wound on the inner aspect of the thigh continues to suppurate and the left hind limb is still increased in dimensions. Temp. A.M. 38·8°C., P. 56, R. 12; P.M. 39·8°C., P. 56, R. 14.

4th.—The symptoms noted yesterday remain unaltered. Temp. A.M. 38·7°C., P. 56, R. 13; P.M. 38·7°C., P. 64, R. 12.

5th.—There is no change in the condition of the animal. Temp. A.M. 39·1°C., P. 56, R. 12; P.M. 39·1°C., P. 64, R. 16.

6th.—The last of the plaques No. 80 has disappeared, otherwise there is no change in the condition of the animal to note. Temp. A.M. 38·9° C., P. 58, R. 16; P.M. 39·4°C., P. 66, R. 16.

7th.—The left hind limb has increased considerably in size, and the swelling and œdema of the udder has extended backwards and downwards so that a bag has formed between the thighs. Temp. A.M. 38·8°C., P. 60, R. 16; P.M. 39·4°C., P. 56, R. 16.

8th.—The animal continues to feed well and has always done so during the whole period she has been under observation. All the symptoms are increasing in severity, and as the animal was greatly emaciated and losing strength daily, chloroform was administered in excess and death ensued. Temp. A.M. 38·9°C., P. 64, R. 12.

AUTOPSY.—All plaques had disappeared from the surface of the body some days previous to death.

The vaginal m. m. was free from mucous and petechiæ.

The conjunctivæ and schreiderian mucous membranes were free from petechiæ, etc.

Pleural cavities, 200 c.c. clear amber-coloured fluid.

Lungs, organs distended with air.

Pericardium contains 180 c.c. amber-coloured fluid.

Heart weighs 6 lbs. 8 ozs.—normal in appearance.

Peritoneal cavity contains about 200 c.c. clear amber-coloured fluid.

Liver, tissues firm, *on section* present healthy appearance, weight 14 lbs. 14 ozs.

Spleen tissues firm, *on section* dark red in colour, weight 2 lbs. 6 ozs.

Kidneys, capsules strip easily—

	lbs.	ozs.
Weight—right	2	15½
left	2	15

Vagina and *uterus* normal in appearance.

Spinal Cord capillary vessels of membranes of lower dorsal and lumbar regions injected with dark blood, also the superior and inferior vessels of the cord. *On section* no softening visible—cord preserved—to the naked eye. In the lower dorsal and lumbar regions, the spinal cord was found to be atrophied. Its transverse sections were symmetrical and the grey matter was atrophied.

MARE III.

TABLE XIX.

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after inoculation.	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUE. 1st. Appearance.	1st. Disappearance.	2nd. Appearance.	2nd. Disappearance.	3rd. Appearance.	3rd. Disappearance.	DURATION OF PLAQUES IN DAYS. 1st Appearance.	2nd Appearance.	3rd Appearance.	Dimension of plaques in inches.	REMARKS.
		Days.	1903	1903	1903	1903	1903	1903					
1	L. side chest	34	May 20th	May 27th	June 4th	June 12th	July 15th	July 18th	7	8	3	2·0 diam	Circular, pitted in centre.
2	L. ribs .	49	June 4th	June 7th	...	..	...	..	3	.	...	2·5 „	Semi-lunar.
3	R. ribs .	55	„ 10th	„ 12th	...	...	..	..	2	...	...	1·0 „	Pitted in centre.
4	L. ribs .	56	„ 11th	„ 20th	...	...	...	...	9	..	...	1·5 „	Raised, hard.
5	L. hip .	62	„ 17th	„ 18th	July 4th	July 10th	...	...	1	6	...	0·5 „	Pitted in centre.
6	L. hip .	62	„ 17th	July 7th	...	...	...	...	21	...	.	0·5 „	Urticarial.
7	L. croup .	62	„ 17th	June 30th	...	..	..		13	...	...	1·0 „	Raised.
8	L. croup .	62	„ 17th	„ 19th	July 2nd	July 14th	...	...	2	12	...	0·5 „	Urticarial, circular.
9	R. croup .	62	„ 17th	„ 19th	...	...	...	...	2	...	...	0·5 „	Urticarial.
10	L. ribs .	62	„ 17th	„ 19th	...	...	...	...	2	...	..	3·5 × 2·5	Urticarial.
(6)	L. ribs .	62	„ 17th	„ 19th	...	...	...	...	2	...	...	0·5 diam.	Urticarial.

TABLE XIX—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after inoculation.	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.						DURATION OF PLAQUES IN DAYS.			Dimension of plaques in inches.	REMARKS.
			1ST.		2ND.		3RD.						
			Appearance.	Disappearance.	Appearance.	Disappearance.	Appearance.	Disappearance.	1st Appearance.	2nd Appearance.	3rd Appearance.		
		Days.	1903	1903	1903	1903	1903	1903					
(c)	L. ribs	62	June 17th	June 19th	June 24th	July 5th	...	...	2	12	...	0·5 diam.	Urticarial.
(d)	L. ribs	62	„ 17th	July 3rd	...	...	...	...	16	...	...	1·0 „	Urticarial, increased 1·5 inches
11	L. labium	62	„ 17th	„ 18th	...	...	...	...	1	...	...	0·5 „	Urticarial
12	R. ribs	62	„ 17th	„ 23rd	...	...	...	...	6	...	...	1·5 „	Pitted in centre.
13	R. abdomen	64	„ 19th	„ 27th	...	...	...	...	8	...	...	1·5 „	Urticarial, pitted in centre, soft.
14	R. hip	70	„ 25th	„ 5th	...	...	...	...	11	...	...	0·75 „	Urticarial, circular.
15	R. ribs	71	„ 26th	„ 2nd	...	...	...	...	7	...	...	3 × 1·5	Pitted in centre.
16	R. ribs	71	„ 26th	„ 5th	...	...	...	...	9	...	...	0·5 diam.	Urticarial.
17	R. hip	72	„ 27th	„ 5th	...	...	...	...	9	...	...	0·5 „	Urticarial.
18	R. hip	72	„ 27th	„ 2nd	...	...	...	...	6	...	...	0·5 „	Urticarial.
19	R. shoulder	72	„ 27th	„ 11th	...	...	...	...	15	...	...	1·0 „	Circular, pitted in centre.

20	R. withers	79	July 4th	,, 20th	...	...	...	...	16	...	...	1·25 ,,	Circular, pitted in centre.
21	R. ribs .	79	,, 4th	,, 10th	...	...	...	...	6	...	...	0·5 ,,	Urticarial, increased.
22	R. ribs .	79	,, 4th	,, 9th	...	...	...	...	5	...	...	0·5 ,,	Urticarial.
23	Root of tail	79	,, 4th	,, 27th	...	...	...	...	23	...	...	0·5 ,,	Urticarial.
24	R. flank .	79	,, 4th	,, 10th	...	...	...	...	6	...	...	1·5 × 0·5	Urticarial.
25	R. ribs .	79	,, 4th	,, 18th	July 21st	July 28th	...	...	14	7	...	2·0 diam.	Urticarial.
26	L. ribs .	90	,, 14th	,, 29th	...	...	...	...	15	...	...	0·75 ,,	Urticarial.
27	L. hip .	90	,, 14th	,, 28th	...	...	...	...	14	...	...	0·50 ,,	Pitted in centre.
28	R. flank .	90	,, 14th	,, 26th	...	...	..	...	12	...	...	0·50 ,,	Urticarial.
29	L. flank .	91	,, 15th	,, 19th	July 22nd	Aug. 4th	..	...	4	14	—	0·75 ,,	Urticarial.
30	R. ribs .	93	,, 17th	,, 18th	,, 21st	,, 8th	..	...	1	19	...	0·5 ,,	Urticarial.
31	R. flank .	94	,, 18th	,, 28th	...	...	...	...	10	...	...	3 × 1·25	Urticarial.
32	R. ribs .	97	,, 21st	Aug. 1st	...	...	...	...	12	...	..	1·25 diam.	Pitted in centre.
33	R. neck .	97	,, 21st	July 24th	...	..	...	...	3	..	...	0·75 ,,	Urticarial.
34	R. ribs .	97	,, 21st	,, 31st	...	...	...		10	..	...	1·50 ,,	Pitted in centre.
35	L. hip .	97	,, 22nd	,, 31st	Aug. 1st	Aug. 4th	...	...	9	3	...	1·0 ,,	Pitted in centre.
36	L. hip .	102	,, 26th	,, 31st	...	...	...	...	5	...	...	2·0 ,,	Crescentic.
37	L. hip .	102	,, 26th	,, 29th	...	...	...	...	3	...	...	1·5 ,,	Circular.
38	L. side .	102	,, 26th	Aug. 6th	Aug. 8th	Aug. 10th	..	...	13	2	...	2·5 ,,	Pitted in centre.
39	R. ribs .	105	,, 29th	,, 7th	...	...	...	...	10	...	...	1·5 ,,	Pitted in centre.

TABLE XIX—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after inoculation.	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUES IN DAYS.		Dimension of plaques in inches.	REMARKS.
			1st.		2nd.					
			Appearance.	Disappearance.	Appearance.	Disappearance.	1st Appearance.	2nd Appearance.		
		Days.	1903	1903	1903	1903				
40	R. iliac spine .	105	July 29th	Augt. 4th	...	...	7	...	1·25 diam.	Pitted in centre.
41	R. hip . .	106	,, 30th	,, 12th	...	...	14	...	1·5 ,,	Urticarial.
42	R. ribs . .	107	,, 31st	,, 16th	...	...	16	...	1·5 ,,	Pitted in centre.
43	R. shoulder .	107	,, 31st	,, 9th	...	...	9	...	1·5 ,,	Pitted in centre.
44	R. ribs . .	107	,, 31st	,, 9th	...	...	9	...	0·5 ,,	Urticarial.
45	L. ribs . .	107	,, 31st	,, 7th	...	...	7	...	2·0 ,,	Urticarial.
46	L. ribs . .	107	,, 31st	,, 7th	...	...	7	...	4·5 x 2·5	Pitted in centre.
47	L. ribs . .	107	,, 31st	,, 6th	...	...	6	...	0·5 diam.	Two small lumps.
48	L. ribs . .	114	Aug. 7th	,, 9th	...	...	2	...	6·0 x 2·0	Urticarial.
49	R. flank . .	115	,, 8th	,, 11th	...	...	3	...	2·0 x 1·0	Kidney-shaped.
50	R. hip . .	116	,, 9th	,, 11th	Aug. 16th .	Aug. 24th .	2	8	1·0 diam.	Pitted in centre.

51	R. shoulder .	117	,,	10th	,,	11th	...	...	1	...	1·0 ,,	Urticarial.
52	R. neck . .	117	,,	10th	,,	15th	...	...	5	...	1·25 × 0·5	Kidney-shaped.
53	R. abdomen .	117	,,	10th	,,	13th	...	...	3	...	3 × 2·5	Pitted.
54	L. anal region .	117	,,	10th	,,	15th	...	...	5	...	1·25 diam.	Pitted in centre
55	R. flank . .	119	,,	12th	,,	13th	...	...	1	...	1·0 ,,	Pitted in centre.
56	R. anal region .	120	,,	13th	,,	15th	...	...	2	...	5·0 × 3·0	Pitted.
57	L. scapular .	121	,,	14th	,,	16th	..	...	2	...	1·0 × 0·5	Urticarial.
58	R. flank . .	125	,,	18th	,,	24th	...	...	6	...	1·0 diam.	Pitted in centre.
59	R. flank . .	125	,,	18th	,,	31st	...	...	13	...	0·75 ,,	Urticarial.
60	R. abdomen .	132	,,	25th	Sept.	8th	...	...	15	...	1·0 ,,	Urticarial, pitted.
61	R. abdomen .	134	,,	27th	Aug.	30th	...	...	3	...	0·25 ,,	Urticarial.
62	R. abdomen .	134	,,	27th	Sept.	8th	...	...	13	...	0·25 ,,	Urticarial.
63	R. abdomen .	134	,,	27th	,,	8th	...	...	13	...	0·25 ,,	Urticarial.
64	L. hip . .	138	,,	31st	,,	8th	...	...	8	.	1·0 ,,	Pitted in centre.
65	L hip . .	138	,,	31st	,,	12th	...	...	12	...	1·0 ,,	Pitted in centre.
66	L. flank . .	138	,,	31st	,,	9th	...	...	9	...	4·0 ,,	Pitted in centre, only border raised.
67	L. chest . .	138	,,	31st	,,	9th	...	...	9	...	2·0 ,,	Pitted in centre.
68	R. ribs . .	141	Sept.	3rd	,,	12th	...	...	9	...	2·5 × 2	Raised centre.
69	R. hips . .	151	,,	13th	Oct.	8th	...	...	26	...	1·0 × 0·5	Raised.
70	R. hips . .	152	,,	14th	,,	8th	.	...	24	...	0·75 diam.	Pitted in centre.

TABLE XIX—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration, etc., of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after inoculation.	DATES OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUE IN DAYS		Dimension of plaques in inches.	REMARKS.
			1ST.		2ND.					
			Appearance.	Disappearance.	Appearance	Disappearance.	1st Appearance.	2nd Appearance		
		Days.	1903	1903	1903	1903				
71	R. ribs . .	152	Sept. 14th	Sept. 29th	Oct. 15th	Oct. 22nd	15	8	2·5 × 2·0	Pitted in centre.
72	R. neck . .	155	" 17th	" 27th	...	...	10	...	1·0 diam.	Triangular.
73	R. buttock .	162	" 24th	Oct. 4th	...	...	10	.	2·0 × 1·0	Became circular, 28th September.
74	R. chest . .	162	" 24th	" 5th	Oct. 15th	Oct. 30th	11	15	1·0 diam.	Urticarial.
75	R. thigh . .	166	" 28th	" 4th	..	...	6	..	6·0 × 3·0	Pitted.
76	R. side root of tail.	166	" 28th	" 14th	...	...	16	.	5·0 × 1·0	Urticarial.
77	L. side 8th rib .	177	" 9th	" 28th	...	...	19	..	2·0 × 0·5	Urticarial.
78	R. abdomen .	179	" 11th	" 22nd	...	...	11	..	2·0 × 1·0	Urticarial.
79	L. chest . .	181	" 13th	" 24th	...	...	11	..	2·0 diam.	Pitted in centre.
80	R. crest . .	182	" 14th	Nov. 6th	...	...	23	...	2·0 "	Pitted in centre.

MARE IV.

Scarification of m. m. of R. labium pudendi, and inoculation of fresh blood obtained from a Dourine plaque on English T. B. stallion Kilngarth—*Tumefaction of both labia on 15th day, and œdema of perineum—Absence of the trypanosoma from vaginal mucus—First plaque appeared on 70th day following inoculation (presence of trypanosomata demonstrated), followed at intervals during a period of 105 days by successive crops of plaques numbering 18 in all, which involved the skin of the body and neck—Slight enlargement of maxillary glands—Gelatinous infiltration of subcutaneous and deeper structures in various parts of the body—Stiffness, later dragging of the hind limbs whilst walking—Amelioration of symptoms; considerable improvement in condition—Further eruption of a plaque after intermission lasting 97 days.*

A bay Australian mare foaled in 1897, 15-2½ hands, purchased 20th November 1901, was cast from the Government Remount Depôt, Karnal (No. 6418), as a bad roarer, on 7th March 1903. The animal when received at Bareilly was in good condition; the temperature during the following 6 weeks always remained between 37° and 38° C.

April 10th, 1903.—The mare was removed from the Plains Laboratory to Muktesar, 7,500 feet above sea-level, and remained in the hills until November 10th, 1903, when she was again removed to Bareilly Depôt.

April 17th, 1903.—Scarification with a fine needle was performed, involving 0·5 centimetre square of the mucous membrane of the right labium vaginæ in such a way as to draw little or no blood. As in the case of mare III, inoculated at the same time, a slight trace of blood was removed from a Dourine plaque on *Kilngarth* (T. B. English stallion) on the point of a scalpel and spread over the scarified mucous-membrane and allowed to dry somewhat before the labia were brought into apposition.

Between the 17th and 26th April inclusive the animal fed well and exhibited no symptoms of disease. The morning and evening temperatures varied but a few points, the maximum and minimum readings being 37·9° and 37·1°C., the pulse and respirations averaging 40 and 13 respectively.

On the 26th April, the 10th day following inoculation, the vaginal m. m. presented a red colour and the small capillary vessels were injected. After three days the right labium was tumified, and by the 15th day following inoculation the vaginal m. m. became œdematous, both labia double the normal dimensions, while the œdema had spread on either side of the vulva forming folds in the tissues and over the perineum. Forty-eight hours later the œdema extended downwards in the subcutaneous tissues of the right thigh and on palpation was found to be somewhat hot and semi-solid in consistency. The œdematous condition of the vaginal m. m. persisted and eight months later was well marked, but most of the other portions of the body invaded by the gelatinous deposits from time to time were of an evanescent character, and daily exercise, especially walking up hill, was usually sufficient to reduce and at times to totally disperse the swellings for short periods, especially those invading the udder and under-surface of the abdomen.

On the 67th day the submaxillary glands were found to be slightly increased in size, and three days later the first Dourine plaque appeared on the skin of the right ribs. Between the 25th June and 8th October, the 70th to 175th days following inoculation, eighteen plaques appeared in all, varying in size and form, mostly urticarial in character. Trypanosomata were demonstrated in blood drawn from the majority of these plaques. Then, on January 13th, 1904 (272nd day), after a long intermission lasting 97 days a further plaque made its appearance.

On the 14th July (89th day), some 18 hours after the eruption of plaque No. 4, the mare showed symptoms of colic, which continued at intervals up to 6 P.M. when she aborted a four months fœtus (trypanosoma not discovered in fœtal blood). The mare probably had been covered while running loose in the Karnal Depôt paddocks several weeks previous to being received at the Bareilly Laboratory. On the 92nd day œdema of udder first appeared, followed on the 113th by infiltration forward along the under-surface of the abdomen. It was not until September 28th (165th day) that any symptoms of difficulty in locomotion were noted. At first there was only stiffness of the right hind limb when walking, which however persisted until both limbs became affected. On the 215th day after inoculation, the animal dragged the right limb and two days later both limbs in walking. On the 223rd day the animal fell, and was unable to rise without assistance, but when she was raised on to her legs, again maintained the upright position. The right fore-limb became swollen, and fluid appeared in several of the joints.

The animal whose body weight six months before was 1,105 lbs. now rapidly lost flesh : there was especially marked atropy of the muscles of the hips and loins, but the appetite never failed, and the body temperature maintained almost an even course between 37° and 38° C.

During a considerable period there occurred alternately those augmentations and diminutions in the size of the lips of the vulva, and in the œdematous swellings in various regions of the body, but principally involving the external genital organs and under-surface of the abdomen and limbs.

January 12th, 1904, the 271st day after inoculation. The mare feeds well, has improved considerably in condition, but there is still stiffness in the hind limbs, the back giving way under pressure over the loins and when walking she lifts her limbs carefully. The superficial inguinal and submaxillary glands are still slightly enlarged, but not harder than normal. The vaginal mucus has been constantly examined miscroscopically up to the 12th January 1904 for the presence of trypanosomata, and although on the 18th August petechiæ appeared on the vaginal m. m., nevertheless no trypanosoma has been discovered in the vaginal mucus unmixed with blood.

January 13th (272nd day). A fresh plaque appeared on the right side of the chest after an intermission lasting 97 days.

MARE IV.

TABLE XX

Showing the number of plaques, their situation, dates of appearance and disappearance together with the duration, etc., of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after scarification and inoculation.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE. 1ST.		2ND.		DURATION OF PLAQUES IN DAYS.		Dimension of plaques in inches	REMARKS.
			Appearance.	Disappearance.	Appearance.	Disappearance.	1st App.	2nd App.		
		Days.	1903	1903						
1	R. ribs . .	70	June 25th	June 30th	...	...	5	...	0·5 diam.	Urticarial.
2	Croup . .	74	„ 29th	July 2nd	...	...	3	...	1·5 „	Urticarial.
3	R. shoulder .	78	July 3rd	„ 5th	...	...	2	...	0·4 × 2·5	Urticarial, surrounded by small eruption of spots.
4	R. side anus .	88	„ 13th	„ 19th	...	...	6	...	1·0 diam.	Urticaria (15th 1·5 diam.
5	L. ribs . .	92	„ 17th	„ 27th	...	...	10	...	2·5 × 1·5	Urticarial (19th) 4·5 + 3·0 (20th) pitted in centre (23rd), 5·5 × 3·0.
6	L. ribs . .	98	„ 23rd	„ 27th	...	...	4	...	2·5 × 1·75	Oval, urticarial.
7	L. ribs . .	99	„ 24th	„ 25th	...	...	1	..	5·5 × 2·0	Oval, urticarial.
8	R. ribs . .	137	„ 31st	Sept. 9th	...	...	6	...	2·5 × 0·5	Urticarial pitted.
9	R. flank. .	137	„ 31st	„ 2nd	...	...	2	...	2·0 diam.	Pitted in centre.
10	R. ribs . .	140	Sept. 3rd	„ 6th	...	...	3	...	1·5 „	Urticarial.
11	L. ribs . .	140	„ 3rd	„ 8th	...	...	5	9	1·5 „	Urticarial.
12	R. neck . .	144	„ 7th	„ 18th	...	...	11	...	2·5 × 1·5	Semi-lunar in form urticarial.
13	L. ribs . .	149	„ 12th	„ 15th	..	...	3	...	2·0 diam.	Pitted in centre.
14	R. ribs . .	149	„ 12th	„ 20th	...	..	8	...	1·5 „	Urticarial.
15	R. thigh .	175	Oct. 8th	Oct. 12th	...	...	4	...	3·0 × 1·0	Urticarial.
16	L. crest .	175	„ 8th	„ 11th	...	.	3	...	1·0 × 0·75	Pitted.
17	L. crest .	175	„ 8th	„ 13th	...	...	5	...	2·5 × 2·0	Urticarial.
18	R. thigh .	175	„ 8th	„ 15th	...	...	7	..	3·0 diam.	Quite circular and flat.
			1904	1904						
19	R. crest. .	272	Jan. 13th	Feb. 1st	...	...	19	...	2·5 „	Urticarial, pitted in centre 21st, increased, 25th both sides of crest.
20	R. abdomen .	332	Mar. 13th	Mar. 22nd	...	...	9	...	4·5 × 2·0	Kidney-shaped.
2*	L. ribs . .	338	„ 19th	„ 25th	...	...	6	...	4·0 × 2·0	Kidney-shaped.

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* Two further plaques appeared within the first few days of April 1904. No more plaques up to date, Oct. 18th, 1904.

MARE V.

New Zealand mare, covered twice within 48 hours by Yadgir, *an Arab stallion the subject of Dourine, exhibiting a sore on the anterior superior surface of the free portion of the penis—Vesicular eruption, ulcers on labia vaginæ followed by leucodermic patches—Swelling and œdema of external genitals and perinæum, later tissue around anus involved. Vaginitis and muco-purulent discharge—Appearance of the trypanosoma in the blood obtained from the vaginal petechiæ—Absence of the protozoon from vaginal mucus during the whole course of the disease—Complete absence of cutaneous plaques, urticaria or eruption of any kind—Symptoms of paraplegia developed suddenly, inability to stand—Death—Post-mortem.*

A bay New Zealand mare, 14—3½ hands, foaled in 1897, was cast from the Government Remount Depot, Karnal, on the 7th March 1903 as incurable suffering from ringbone 83 days, P. C lame, near eye-ball ruptured. During the period which elapsed between the receipt of the animal from Karnal and the 11th May 1903, the temperature never fell below 37° or rose above 38° C.

The mare was covered on two occasions, *viz.*, 11th and 13th May 1903, by *Yadgir*, an Arab horse suffering from Dourine, which presented a small sore on the anterior and superior surface of the free portion of the penis.

A vesicular eruption appeared on the external genital organs of the mare on the 21st May which on the 23rd formed ulcers, from which a sticky, viscid fluid exuded which dried and formed a film resembling a thin coating of collodion, over the surface of each individual ulcer. Marked swelling and œdema of the external genitals followed. The primary symptoms persisted until the 5th June when the dry film commenced to loosen at their edges and later to separate, they then disclosed patches destitute of pigment (leucoderma) on the site previously occupied by each ulcer. All the films had separated by the 11th, and the labia presented a pie-bald appearance. On the 10th June the swelling and œdema of the vulva had slightly decreased in amount and progress in this direction continued until the 19th, when the above symptoms became stationary and the vaginal m. m. assumed a bright red colour, but there was no discharge from the passage. On the 22nd June, the sub-maxillary glands which up to this date had maintained their normal size, then became enlarged and hard on palpation. Increased swelling and œdema of the labia occurred on the 28th, and on the 29th a little semi-opaque viscid fluid escaped from the vagina on one occasion only. Microscopical examination of the fluid gave a negative result with regard to the presence of the trypanosoma. The swelling and œdema gradually increased and the tissues of the perinæum became infiltrated on the morning of July 3rd. On the 5th of the same month a muco-purulent discharge emanating from the vagina commenced to escape, but in this fluid no trypanosomata were discovered. The flow continued uninterruptedly until the 12th, when it ceased. During this interval the œdéma involving the perinæum gradually decreased and finally disappeared on the 10th, but the swelling and œdema of the external genitals remained stationary until the 15th July, when the tissues around the anus became implicated and assumed a size twice their normal proportions. Swelling of the near hind fetlock was observed on the morning of the 17th. The animal which up to the 19th July had always taken its food well, and had presented no weakness in the hind limbs, on the morning of the 20th was found lying down off feed, dull, and when raised with assistance into the erect position was found to have lost power over the hind quarters and was unable to stand. Temp. A.M 38·4° C., P. 64, R. 24.

Swelling and œdema of the external genitals involving the tissues around the anus were present, the vaginal m. m. exhibited a number of small petechiæ and microscopical specimens of the blood obtained from them exhibited as many as 14 trypanosomata in one cover-glass. For the next two days 21st and 22nd the animal fed but only slowly in the recumbent position. The swelling and œdema increased and became infiltrated to the perinæum and thighs, at the same time the vaginal petechiæ persisted. The temperature rose to 39° C., P. 80, R. 30. On the day previous to that on which death occurred, the œdema involving the tissues of the anus and external genital organs decreased in amount, but increased over the perinæum, while the temperature rose to 39·9° C., P. 88, R. 46. The animal succumbed on the morning of the 24th July.

AUTOPSY, shortly after death. Presence of yellow-coloured gelatinous infiltration under the skin of chest, perinæum, etc.

Lungs.—Both organs present a few sub-pleural petechiæ dotted over their surfaces. Slight emphysema of apices.

Pericardial sac contains 50 c.c. of a dirty yellow coloured fluid.

Heart.—Sub-endocardial extravasations in left ventricle, otherwise normal in appearance. *Liver* appears enlarged. *Spleen* tissues firm, normal in size.

Kidneys.—Yellow gelatinous material in the hilum of both organs, tissues present healthy appearance.

Large and small intestines.—Deposition of yellow coloured gelatinous material on the external surfaces, especially along the course of the intestinal bands on the former.

Spinal cord.—Membranes contain a small quantity of clear fluid. The capillary vessels lying upon the superior and inferior surfaces of the posterior dorsal and lumbar portions of the cord are injected with dark-coloured blood.

On Section.—No centres of softening are visible to the naked eye. Careful microscopical examination of specimens from the fresh cord failed to reveal the presence of the mature trypanosoma in any portion of it, and similar results were noted with regard to the examination of the cerebro-spinal fluid.

MARE VI.

Country-bred mare covered by Arab stallion Monarch, *the subject of Dourine (during early period of eruption of cutaneous manifestations, but absence of sores from penis)—No vesicles or other eruption implicating vulva or vaginal m. m. First plaque appeared on 31st day following primary covering (trypanosoma) followed at irregular intervals by successive crops of plaques which involved the skin of the body and neck principally. Thickening of labia pudendi, followed by œdema of udder and later by œdema on under-surface of abdomen—Stiffness of the right hind limb.—Absence of leucodermic patches implicating tissues of vulva, anus and udder, as also of nervous symptoms up to the 235th day after covering.*

A bay country-bred mare 13-½ hands, aged 6 years, *Sire* Finale, was cast from the Government Remount Depot, Hapur, on the 21st May 1903. The animal was received at the Laboratory, Muktesar, on the 25th May 1903.

The mare during a period of œstrum was covered on June 11th, 1903, and on several occasions during the next few days, by an Arab Horse, *Monarch* suffering from Dourine, (experimentally contracted) during the early stage of eruption of cutaneous plaques, but the penis was free from sores or eruption of any kind.

No vesicles or ulcers involving the vaginal m. m. or vulva followed the unions. On the 11th July, the 31st day following the primary covering, three plaques made their appearance between 6 A.M. and noon, involving the skin of the right side of the neck, flank and hip, followed later in the day by a fourth situated on the left side of the neck. The trypanosoma was searched for and discovered in the blood drawn from three of the plaques examined. Between the 11th July 1903 and the 8th January 1904, a period of 181 days, 75 plaques made their appearance at irregular intervals, on the skin of the neck, body, and hind quarters, leaving the cutaneous surfaces of the limbs unaffected. The plaques appeared singly, in pairs or in numbers up to eight within 24 hours, the interval between the appearance of the successive crops of plaques varying in length from one to thirty days.

During the interval between the 11th June 1903 and January 31st, 1904, but few symptoms other than those before mentioned were observed. The following, however, require special notice. On the 12th July 1903, the day following the eruption of the first cutaneous manifestations, the inferior commissure of the vulva became enlarged and œdematous; three days later, 15th, the left labium became increased in size, and on the 19th both labia were equally thickened. By the 4th August, the vulva became pendulous from the amount of œdematous swelling present. By the morning of August 10th all the swelling had subsided, the œdema had become absorbed and the vulva presented its normal condition.

Swelling and œdema of the udder was noted on the 27th July, and after persisting for several days became absorbed on the same date (August 10th) as that involving the vulva. The former did not subsequently recur.

Later, 10th October, œdema made its appearance on the under-surface of the abdomen, spreading forward; after increasing and diminishing in amount alternately, it disappeared on November 2nd, but returned on several occasions after varying intervals, *viz.*, 4th to 22nd December and 18th to 29th January 1904. On the morning of the 29th July the vaginal m. m. presented a bright red line and this condition persisted until the 16th August 1903, when it resumed its normal colour. During a considerable portion of the period that this animal was under observation there was an absence of vaginal secretion, even to the mucus usually present in small quantity, except when the mare was placed in a loose box in the same building, but at a distance from the stallion.

Petechiæ dark red in colour were recognized on the 20th November invading the m.m. of the vagina, circular in form and $\frac{1}{20}$th to $\frac{1}{10}$th inch in diameter. In blood collected from several of these small extravasations for microscopical examination, the trypanosoma was demonstrated. After a period of 24 hours had elapsed little, if any, signs of the remaining petechiæ could be discovered. It was not until 23rd December 1903 that the trypanosoma was found in the vaginal mucus for the first time, although a large number of observations with that end in view had been conducted during the previous course of the case.

The temperature of the animal, during the period of ten months which elapsed between the 3rd June 1903 and 31st January 1904 followed for the most part an almost even course, the morning and evening records showing but a few points variation above or below 37° and 38°C. respectively. The maximum evening reading 39·6° C. was noted on one occasion at the time of the eruption of No. 21 plaque, the minimum morning 36·9° C. being also registered but once.

Points of interest in case of mare VI.

Date of first covering by *Monarch* 11th June 1903.

,, ,, ,, plaque appearing .	11th July	,,	31st day after primary covering.
,, ,, finding trypanosoma in blood of plaque :	11th ,,	,,	31st ,, ,, ,, ,,
,, ,, thickening of vulva .	12th ,,	,,	32nd ,, ,, ,, ,,
,, ,, appearance of œdema of udder.	27th ,,	,,	47th ,, ,, ,, ,,
,, ,, ,, ,, under-surface of abdomen	21st Oct.	,,	133rd ,, ,, ,, ,,
,, ,, ,, ,, petechiæ on vaginal m. m.	20th Nov.	,,	163rd ,, ,, ,, ,,
Trypanosoma found in vaginal mucus.	11th Dec.	,,	184th ,, ,, ,, ,,

MARE VI. TABLE XXI.

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively, during a residence in the hills (7,500 ft. elevation) and in the plains.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				Duration of plaques.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.					
			Appeared.	Disappeared.	Appeared.	Disappeared.	1st days	2nd days.		
		Days.	1903	1903.						
1	R. neck .	31	July 11th	July 17th	...	...	6	...	1·0×0·75	Urticarial, (15th July) increased 3·0×2·0 oval.
2	R. flank .	31	„ 11th	„ 16th	..	...	5	...	1·0×0 5	Urticarial, (14th) increased.
3	R. hip . .	31	„ 11th	„ 13th	..	...	2	...	0·5 diam.	Urticarial.
4	L. neck .	31	„ 11th	„ 17th	.	...	6	...	3·0×2·5	Oval, pitted, raised borders, (12th) more prominent, (15th) divided into two.
5	R. neck .	34	„ 14th	„ 17th	...	...	3	...	1·0 diam.	Urticarial, soft.
6	R. hip . .	37	„ 17th 8 A M	„ 19th	...	...	2	...	1·25 „	Pitted in centre.
7	R. hip . .	37	„ 17th 8 A.M	„ 19th	...	...	2	...	0·5 „	Urticarial.
8	R. hip . .	37	„ 17th 8 A.M	„ 19th	...	...	2	...	0·5 „	„
9	R. thigh .	37	„ 17th 9 A M	„ 19th	...	...	2	...	0 5 „	Pitted in centre.
10	R. thigh .	37	„ 17th 9 A.M.	„ 25th	..	...	8	...	0·5 „	Urticarial, (July 19th) 1·0 diam., pitted in centre, (23rd) 2·5 inches diam.
11	R. thigh .	37	„ 17th 9 A M	„ 19th	..	...	2	...	0 5 „	Pitted in centre.
12	R. thigh .	37	„ 17th 9 A.M.	Aug 2nd	...	...	16	...	0 25 „	Urticarial, (19th) 1·0 diam. pitted in centre, (23rd) 2·5 diam. (24th) more prominent (27th) 3·0 diam.
13	R. thigh .	37	„ 17th 9 A.M.	July 20th	..	...	3	...	0·25 „	Urticarial raised.
14	R. flank .	40	„ 20th	„ 22nd	...	...	2	...	0·25 „	„
15	R. abdomen .	41	„ 21st	„ 25th	...	...	4	..	0·75 „	„ (24th) increased.
16	R. neck .	46	„ 26th	Aug. 5th	...	...	10	...	2·0×1 0	Irregular borders well raised, (28th) more prominent.
17	R. thigh .	47	„ 27th	July 29th	...	...	2	...	2·0 diam.	Urticarial.
18	R. abdomen	48	„ 28th	Aug. 9th	...	...	12	...	0·75 „	Urticarial. July 29th 1·5 in diam., (Aug. 6th) 5·0 in diam. pitted in centre.

TABLE XXI—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively, during a residence in the hills (7,500 ft. elevation) and in the plains.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				Duration of plaques.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.					
			Appeared	Disappeared.	Appeared.	Disappeared.	1st days.	2nd days.		
		Days.	1903.	1903.						
19	R. neck .	48	July 28th	July 31st	...	...	3	...	4·0×3·0	Oval urticarial.
20	R. hip . .	50	„ 30th	Aug. 16th	...	...	17	...	1·0 diam	Urticarial, (1st Aug.) 1·0 diam.
21	R. side croup	54	Aug. 3rd	„ 4th	...	...	1	...	0·5 „	Pitted in centre.
22	L. neck .	57	„ 6th	„ 9th	...	...	3	...	2·0 „	Semi-lunar in form.
23	R. flank .	57	„ 6th	„ 9th	...	...	3	...	1·5 „	Pitted in centre.
24	R. ribs .	58	„ 7th	„ 9th	Aug. 14th	Aug. 17th	2	3	2·0×1·0	Oval, pitted.
25	L. shoulder .	64	„ 13th	„ 15th	...	...	2	...	0·75 diam.	Urticarial.
26	R. abdomen .	68	„ 17th	„ 19th	...	...	2	...	2·0 „	Pitted in centre.
27	R. neck .	70	„ 19th	„ 27th	...	...	8	...	0·5 „	Pitted in centre (20th) 0·75×0·5 soft (21st) 1·0 diam.
28	R. neck .	72	„ 21st	„ 30th	...	...	9	.	0·5 „	Semi-lunar in form, (26th) more prominent and circular.
29	R. neck .	72	„ 21st	„ 27th	...	...	6	...	2·5 „	Urticarial.
30	R. neck .	74	„ 23rd	„ 27th	...	...	4	...	0·5 „	Pitted in centre.
31	R. neck .	74	„ 23rd	Sep. 4th	...	...	12	...	1·0 „	Pitted in centre, (24th) 1·25 diam. (25th) more prominent (27th) 2·25, diam.
32	R. ribs .	74	„ 23rd	Aug. 27th	...	...	4	...	1·0 „	Pitted in centre, well marked.
33	R. neck .	74	„ 23rd	„ 27th	...	...	4	...	0·5 „	Pitted in centre.
34	R. neck .	74	„ 23rd	„ 30th	...	...	7	...	1·0×0·5	Semi-lunar, urticarial (26th) circular.
35	R. neck .	74	„ 23rd	„ 27th	...	...	4	...	0·5 diam.	Pitted in centre.
36	R. neck .	74	„ 23rd	„ 24th	...	...	1	...	0·5 „	„
37	R. neck .	74	„ 23rd	Sep. 9th	...	...	11	...	1·0×0·5	Oval, urticarial (20th) increased, circular.
38	R. croup .	86	Sep. 4th	„ 27th	...	...	23	...	1·0 diam.	Urticarial, (13th) September 3·0×3·0
39	R. ribs .	89	„ 7th	„ 9th	...	...	2	...	1·0 „	Urticarial.

TABLE XXI—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively, during a residence in the hills (7,500 ft. elevation) and in the plains.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				Duration of plaques.		Dimension of plaque in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.					
			Appeared.	Disappeared.	Appeared.	Disappeared.	1st days.	2nd days.		
		Days.	1903.	1903.						
40	L. hip . .	94	Sept. 12th	Sept. 27th	...	...	13		1·5 × 1·0	Oval, pitted.
41	L. hip .	94	„ 12th	„ 27th	...	...	13	...	1·0 diam.	Urticarial.
42	L. side .	100	„ 18th	„ 21st	...	...	3	..	1·5 × 0·75	Oval, Urticarial.
43	R. hip .	100	„ 18th	„ 25th	...	...	7	...	2·0 diam.	Urticarial.
44	R. chest .	100	„ 18th	„ 30th	...	...	12	...	3·0 × 2·5	Kidney-shaped urticarial, (20th) became circular.
45	R. chest .	102	„ 20th	„ 29th	...	...	9	...	1·0 diam.	Urticarial.
46	R. Loin .	102	„ 20th	„ 21st	...	...	1	...	1·0 „	„
47	R. spur vein .	103	„ 21st	„ 26th	...	...	5	..	2·0 „	„
48	L. buttock .	107	„ 25th	Oct. 13th	...	...	18	...	2·0 × 1·0	Oval, urticarial.
49	L. quarter .	107	„ 25th	„ 3rd	..	...	8	...	2·0 diam.	Flat, slightly raised border.
50	R. chest .	113	„ 1st	„ 15th	...	...	14	...	2·0 „	„ „
51	R. abdomen .	113	„ 1st	„ 12th	Oct. 18th	Oct. 21st	11	6	3·0 „	Equilateral triangle. } urticarial.
52	L. thigh .	113	„ 1st	„ 11th	...	...	10	..	1·0 „	Urticarial, (7th) increased.
53	L. chest .	113	„ 1st	„ 12th	...	...	11	...	2·0 „	„
54	L. abdomen.	113	„ 1st	„ 13th	...	...	12	...	3·0 × 2·5	Kidney-shaped, urticarial.
55	L. root tail.	122	„ 10th	„ 12th	...	...	2	...	3·0 × 2·5	Oval, urticarial.
56	L. hip .	122	„ 10th	„ 12th	..	...	2	...	3·0 × 2·0	Kidney-shaped urticarial.
57	L. crest .	122	„ 10th	„ 19th	...	...	9	...	3·0 × 1·5	Oval, urticarial.
58	L. crest .	128	„ 15th	„ 19th	..	...	4	...	1·5 diam.	Urticarial.
59	L. back .	128	„ 15th	„ 19th	..	...	4	...	1·5 × 1·0	Oval, urticarial.
60	L. shoulder .	133	Oct. 21st	„ 30th	...	...	10	...	2·0 diam.	Pitted in centre.
61	R. ribs .	136	„ 24th	„ 31st	...	...	6	...	2·5 „	Slightly pitted in centre.
62	L. flank .	137	„ 25th	Nov. 3rd	...	...	9	...	2·5 „	Pitted in centre.
63	L. flank .	137	„ 25th	„ 5th	...	...	11	...	3·0 „	„

TABLE XXI—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively, during a residence in the hills (7,500 ft. elevation) and in the plains.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES.				Duration of plaques.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.					
			Appeared.	Dis-appeared.	Appear-ed.	Dis-appear-ed.	1st days.	2nd days.		
		Days.	1903.	1903.						
64	R. neck . .	142	Oct. 30th	Nov. 7th	...	...	8	...	3·0×2·75	Typical form of Dourine plaque like metal disc.
65	R. thigh . .	143	,, 30th	,, 13th	..	...	14	...	3·5 diam.	Pitted in centre.
66	R. thigh . .	143	,, 30th	,, 5th	...	...	6	...	2·5 ,,	Horse-shoe shaped.
67	R. side chest .	145	Nov. 2nd	,, 12th	...	...	10	...	2·5 ,,	Urticarial.
68	L. side chest .	147	,, 4th	,, 13th	...	...	9	...	1·0 ,,	Pitted in centre.
69	R. ribs . .	147	,, 4th	,, 12th	...	...	8	...	2·5 ,,	Urticarial.
70	R. crest . .	168	,, 25th	Dec. 1st	...	...	6	...	3·0×2·5	Oval, pitted in centre.
71	L. hip . .	175	Dec. 1st	,, 15th	...	...	14	...	1·25×0·75	Lump appeared and second day formed kidney-shaped, urticarial.
72	R. hip . .	175	,, 1st	,, 9th	...	.	8	...	3·5 ,,	Small lump and second day formed circular plaque, slightly pitted in centre.
73	R. hip . .	176	,, 3rd	,, 20th	...	...	17	...	1·5 ,,	Slightly pitted in centre.
			1904.	1904.						
74	L. linea alba .	206	Jan. ,,	Jan. 11th	...	...	9	...	3·5 × 1·0	Horse-shoe form (4th) increase (8th) 3·0×2·25.
75*	L. side crest .	212	,, 8th	,, 17th	...	...	9	...	1·5 diam.	Pitted in centre.

* No. 76 plaque appeared on April 11th and No. 77 on May the 28th, 1904.

MARE VII.

Country-bred mare covered by Arab stallion Monarch, *the subject of recent plaque Dourine. Appearance of Vesicular Exanthema (coital), later followed by leucoderma of the cutaneous parts affected. Eruption of first on the twenty-fourth day after covering. Presence of trypanosoma in blood drawn from first plaque. Eruption of ten plaques in all during 160 days. Presence of the trypanosoma in vaginal mucus on the 50th day and persistence at intervals during whole course of observation lasting 8 months. Absence of weakness across the loins or other cerebro-spinal complications up to the 230th day after primary covering.*

A chestnut country-bred mare, foaled 6th April, 1899, 14-3½. Sire *Bailiff*, thorough-bred English horse, was cast from the Hapur Remount Depôt on the 21st May 1903, and was received at Muktesar on 26th May, in good health and fairly good condition.

This animal during a period of œstrum was covered by the Arab horse *Monarch* on the 30th June and 3rd July 1903. At the time of serving the mare on the first occasion, the penis of the stallion was clean and free from any sores and no symptoms followed the union in the mare ; after the second serving on the 3rd July small ulcers were observed for the first time on the free portion of penis of the horse ; the organ, however, was not noticed to be abnormally enlarged or discoloured.

4th July.—Within a period of 24 hours after the last covering, symptoms of vaginitis had made their appearance. The external surface of the vulva, the inner surface of the labia pudendi and the vaginal mucous-membrane presented vesicles in different stages of development.

The symptoms of this Vesicular Exanthema affected the external and internal tissues concurrently, but for the sake of clearness the descriptions may be described separately.

The external manifestations on the vulva were first observed some 18 hours after the last covering, when vesicles were noted to be dotted over the outer surface of the labia pudendi. Twenty-four hours later the eruption of vesicles had considerably increased and implicated the surrounding parts in close proximity to those previously affected.

On the 6th July each individual vesicle appeared upon a raised and swollen base, some more marked than others, the contents of which were then becoming opaque and of a yellowish tinge ; later all formed pustules, which more or less persisted from the 7th to 11th inclusive. On the morning (12th) most of the contents of the pustules had become evacuated and open sores or ulcers remained in their place. Twenty-four hours later the process of healing commenced and was maintained under scabs until the morning of the 17th, when some of the latter separated and fell off, leaving patches of leucoderma according to the area of the tissues involved in the inflammatory changes. Between the 18th and 22nd the healing process continued and was completed by the latter date. The primary symptoms of the 4th July affecting the vagina, as before stated, consisted of an eruption of vesicles on a highly inflamed mucous-membrane. Within 24 hours (5th) the maximum eruption of vesicles had taken place, and some had already formed superficial ulcers, a form which all assumed later, by the same evening.

From the 6th to the 13th the ulcers remained patent, probably on account of the muco-purulent discharge which appeared on the 10th, and persisted for 48 hours, when its place was taken by a sero-sanguinous discharge on the 12th which made its escape from the vaginal orifice; but it had totally disappeared on the morning of the 31st. The process of healing set in during the 14th, and all ulcers had healed by the following day. The vaginal discharge persisted in small quantity until the morning of the 1st August, when it assumed a dirty colour and sticky character, just before disappearing on the 2nd August. Twenty-six days later (28th) a little muco-purulent discharge escaped from the vagina, but for a further period of many months, during which the animal was kept under constant observation, no further return of it was observed

With regard to the general symptoms, on the morning of the 23rd July 1903, the 24th day after the previous covering, the first cutaneous plaque developed on the left hip, in the blood drawn from which, on microscopical examination, the trypanosoma was discovered. Between the above-mentioned date and the 29th December inclusive, a period of 160 days, a succession of plaques, ten in number, made their appearance singly, or in successive crops within a few days. Thus, it may be observed on reference to Table XXIV, that between the appearance of plaques No. 1 and No. 2, an interval of 26 days elapsed, between group II (consisting of Nos. 2, 3, 4, 5 plaques) and the appearance of No. 6 a similar interval of 26 days elapsed. Between group III (consisting of Nos. 6 and 7) and the appearance of No. 8 an interval of 34 days took place. And between plaques Nos. 8 and 9 a period of 50 days transpired. Thus the length of the period of the intermissions (except in the case of Nos. 1 and 2 which lasted in each instance 26 days) showed a gradual increase during the persistence of the disease, *viz.*, 26, 34, and 50 days respectively.

On the 13th August 1903, the trypanosoma was found for the first time in the vaginal mucus, and, as may be seen in Table XXII, it continued to appear at intervals throughout the period of observation lasting some months.

The chief points of interest with regard to the other symptoms which appeared in this animal between July 1903 and February 1904 may be briefly noted. An œdematous condition of the mucous-membrane of the vagina made its appearance on the 3rd September and still persisted during the following February, and on the 29th September the labia, which had previously remained in apposition, now became persistently patent. The mare showed symptoms of horsing at intervals, but excessive sexual excitement was only present from the 6th to the 10th September inclusive. Considerable injection of the conjunctival capillaries became manifest on the 23rd September and persisted until the morning of the 26th, when it disappeared. The external inguinal glands, which up to the 20th November had shown no variation from the normal condition, were on the date found to be slightly enlarged and harder to the touch, but two months later they had regained their normal proportions. Œdema on the under-surface of the abdomen extending forward first appeared on the 4th November, and after alternately augmenting and decreasing in extent, became absorbed on the 16th of the same month. After an interval of eighteen days it again made its appearance on the 4th December, and after passing through the same phases as mentioned on the former occasion disappeared on the 16th of December. As in the cases of the other horses under observation with Dourine, so in this one the temperature has been recorded morning and evening since the date of its arrival at the Laboratory. A maximum of 40·3° C. was registered on the evening of the 25th September, the morning temperatures on the 25th and 26th being 37·7° and 37·9° respectively This sudden elevation took place during the persistence of plaque No. 5 and the conjunctival symptoms, and therefore may in some way have been accountable for it. The minimum 37·1° C. was registered on the 30th November. Excluding the one maximal record 40·3° C. the evening temperatures varied between 38·5° and 39·2° C., while the morning temperatures during the same period varied between 37·1° and 37·9° C., a difference of only 0·7 and 0·4 points respectively.

The condition of this mare became rapidly worse, until it became difficult for it to remain standing. It was therefore destroyed on 31st March 1904. The pathological changes observed *post-mortem* did not reveal any points of interest other than those noted in previous autopsies.

MARE VII. TABLE XXII

Showing the number of trypanosomata, with their presence in, and absence from, the vaginal mucus on the different dates mentioned.

Date.	Interval from date of first covering. Days.	Number of trypanosomata in specimens examined.		Number of days.		Number of cover-glasses examined on each date.	Remarks.
		Present.	Absent.	Present.	Absent.		
1903.							
July 3rd-Aug. 18th	4th-50th	...	*Nil*	...	47	2	Plaques Nos. I and II appeared on the 23rd July and 18th August respectively.
Aug. 18th	51st	3	...	1	...	2	
20th-22nd	52–54	...	*Nil*	...	3	2	
" 23rd	55	3	...	1	...	2	
" 24th-25th	56–57	...	*Nil*	...	2	2	
" 26th	58	4	...	1	...	2	Plaque No. III appeared August 26th.

TABLE XXII—*contd.*

Showing the number of trypanosomata, with their presence in, and absence from, the vaginal mucus on the different dates mentioned.

Date.	Interval from date of first covering. Days.	Number of trypanosomata in specimens examined.		Number of days.		Number of cover-glasses examined on each date.	Remarks.
		Present.	Absent.	Present.	Absent.		
1903. Aug. 27th	59	...	*Nil*	...	1	2	Plaque No. IV appeared August 27th.
„ 28th	60	110	...	1	...	1	Plaque No. V appeared August 28th.
„ 29th	61	...	*Nil*	...	1	2	
„ 30th	62	437	...	2	...	1	
„ 31st	63	8	...		..	1	
Sep. 1st-2nd	64—65	...	*Nil*	...	2	2	
„ 3rd	66	9	...	...	1	1	
„ 4th	67	2	...	...	1	1	
„ 5th-7th	68—70	...	*Nil*	...	3	2	September 6th to 10th inclusive, sexual excitement particularly marked.
„ 8th	71	3	...	1	...	1	
„ 9th-10th	72—73	...	*Nil*	...	1	2	
„ 11th	74	278	...	3	...	1	
„ 12th	75	57	...		..	1	
„ 13th	76	118	...		...	1	
„ 14th-15th	77—78	...	*Nil*	...	2	2	
Dec. 10th-11th	164—165	...	*Nil*	...	2	2	
„ 12th	166	3	...	1	...	1	
„ 24th-26th	178—180	...	*Nil*	...	3	2	
„ 27th	181	378	...	1	...	1	
1904. Jan. 7th-8th	193—194	...	*Nil*	...	2	2	
„ 11th	197	...	*Nil*	...	1	2	
„ 12th	198	1	...	1	...	2	
„ 21st	207	...	*Nil*	...	1	2	
„ 30th	216	...	*Nil*	...	1	2	

MARE VII. TABLE XXIII

Showing the dates and days after covering on which some of the principal symptoms respectively occurred and to which covering they may be attributed.

Symptoms.	Symptoms referable to coverings. 1903. 30th June, 3rd July.	Appearance of symptoms on days after coverings. 1903. 30th June, 3rd July.
Appearance of vesicles on labia pudendi and vaginal mucous-membrane.	4th July	2nd day.
Ulcers formed on vaginal mucous-membrane.	5th ,,	3rd ,,
Appearance of muco-purulent discharge	10th ,,	8th ,,
,, sero-sanguinous ,,	12th ,,	10th ,,
Ulcers all healed	14th ,,	12th ,,
Appearance of ulcers on the vulva	12th ,,	10th ,,
Ulcers all healed	21st ,,	19th ,,
Appearance of trypanosoma in vaginal mucus.	13th Aug.	45th ,,
Appearance of disseminated urticaria on abdomen.	15th July	16th ,,
Appearance of first cutaneous plaque	23rd ,,	24th ,,
,, ,, the tenth plaque	29th Dec.	183rd ,,
,, ,, œdema vaginal m. m.	3rd Sep.	68th ,,
Still persists	Feb. 1904	
Labia pudendi remained patent	20th Sep.	92nd ,,
Leucodermic patches appeared on vulva	17th July	18th ,,
Conjunctival vessels injected.	23rd Sep.	86th ,,
Œdema of under-surface of abdomen	4th Nov.	128th ,,
,, ,, persisted	16th ,,	140th ,,
Inguinal (external) glands harder than normal.	20th ,,	144th ,,
Left hock swollen and stiff	12th Jan. 1904	197th ,,
Ulceration of L. nostril and septum nasi muco-purulent discharge.	26th Feb. ,,	242nd ,,
Ulceration and necrosis of tissues of labia pudendi and vaginal m. m.	13th Mar. ,,	258th ,,

MARE VII.

TABLE XXIV

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	Length of intermission in days.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUES.		DIMENSION OF PLAQUES.	REMARKS.
				FIRST TIME.		SECOND TIME.					
				Appeared.	Disappeared.	Appeared.	Disappeared.	1st days.	2nd days.	Inches.	
1	L. hip .	Days. 24	26	1903. July 23rd	1903. Aug. 3rd	1903.	1903. ...	11	...	1·25 diam.	Urticarial surrounded by small raised spots.
2	L. hip .	50		Aug. 18th	" 26th	...	..	8	...	1·5 "	Pitted in centre, (19th) 2·0 diam., (20th) 2·5 × 2·0.
3	L. hip .	58		" 26th	" 27th	...	...	1	...	1·5 "	Urticarial, raised.
4	R. ribs.	59		" 27th	Sept. 9th	...	...	13	...	1·0 "	Urticarial, (28th) increased, (29th) 2·0 diam., (1st) 2·5 diam., (4th) 4·5 diam., well marked circumference, (5th to 7th) stationary, (8th) decreased, (9th) disappeared.
5	R. shoulder .	60	26	" 28th	Aug. 31st	...	..	8	...	1·5 "	Urticarial, well raised.
6	L. abdomen.	86		Sept. 23rd	Sept. 26th	Sep. 27th	Oct. 5th	8	9	0·75 "	1st appearance urticarial, raised. 2nd appearance kidney-shaped urticarial, 8·0 × 2·5.

TABLE XXIV—*contd.*

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively.

Number of plaque.	Situation of plaque.	Appearance of plaque after first covering.	Length of intermission in days.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUE.				DURATION OF PLAQUES.		DIMENSION OF PLAQUE.	REMARKS.
				FIRST TIME.		SECOND TIME.					
				Appeared.	Disappeared.	Appeared.	Disappeared.	1st days.	2nd days.	Inches.	
7	R. chest, above spur vein.	92		Sept. 29th	Oct. 11th	...	...	12	...	1·0 diam.	Urticarial.
8	R. crest .	126	34	Nov. 2nd	Nov. 21st	...	...	19	...	1·5 „	Pitted in centre, (3rd to 11th) decreased, (12th) 3·0 × 2·5.
9	R. crest .	176	50	Dec. 22nd	Dec. 28th	...	..	6	...	2·25 × 1·5	Oval pitted, (28th) spread over to left side of crest. (25th) both decreased in size, (26th) left disappeared, (28th) right disappeared.
10	R. buttock .	183		„ 29th	1904. Jan. 5th	...	...	7	...	2·5 × 1·0	Urticarial, kidney-shaped.
11	L. hip . .	250	67	1904. Mar. 5th	Mar. 18th	...	...	13	...	2·5 diam.	Urticarial.
12	L. hip . .	...		„ 5th	„ 19th	...	...	14	...	3·0 „	Urticarial, kidney shaped later.
13	L. hip . .	250		„ 5th	„ 9th	...	...	4	...	2·0 × 0·5	Urticarial, kidney-shaped.

MARE VIII.

Country-bred mare covered by Arab stallion Monarch, *the subject of recent Dourine. Appearance of Vesicular Exanthema (coital), later followed by leucoderma of the external affected parts—Eruption of first cutaneous plaque on thirty-third day after covering (trypanosoma discovered) followed during ensuing three and half months by eighteen similar patches—Vaginal mucus contained trypanosomata in large numbers on the 17th day, and at varying intervals up to 4 months after eruption of last plaque—Absence of cerebro-spinal complications up to 212th day after covering.*

A country-bred mare, Sire unknown, foaled 1st March 1900, 14-3½, was cast from the Government Remount Depôt, Hapur (No. 4268), on May 21st, and was received at Muktesar on the 26th May 1903.

This mare was covered by the Arab stallion *Monarch* at noon on July 5th, 1903. At the time of serving numerous small ulcers existed on the free portion of the penis.

On the morning of July 6th, 19 hours after covering, vesicles had already appeared on the inner surface of the labia pudendi and on the vaginal mucous membrane. On the 7th and 8th, the vaginal m. m. presented a deep red colour and numerous small ulcers existed over its surface and a muco-purulent discharge escaped from the passage. On the 9th, a second series of symptoms appeared complicating the vulva and tissues situated externally. These are described separately. From the 9th to the 17th inclusive, the vaginal symptoms increased in severity, and between the 18th and 20th some of the ulcers on the m. m. healed. On the 21st, the trypanosoma was observed for the first time in the vaginal mucus, the muco-purulent discharge was now intermittent in its appearance, for the most part being only observed in the morning and evening. Twenty-four hours later petechiæ appeared on the m. m. and persisted for several days; they then faded and finally disappeared on the 23rd, and by the morning of the 26th all ulcers on the m. m. had healed.

The external manifestations above referred to were first observed on the morning of the 9th, when vesicles and pustules raised above the surface of the surrounding tissues, both discrete and confluent, were found on the vulva and tissues surrounding that part. During the next 48 hours fresh vesicles and pustules formed, while the ones which previously existed developed into ulcers and from 12th to the 15th the evolutionary process continued, some ulcers healing while fresh ones formed. During the 16th and 17th, the condition appeared to remain stationary, but from this latter date healing proceeded without interruption.

On the 31st July, the vulva became thickened and generally enlarged, and on the following day numerous black film-like scales became denuded, leaving eight patches of leucoderma. The thickened condition of the labia pudendi persisted until the 2nd September when it subsided, but was followed on the 3rd by an œdematous swelling on either side of the vulva which persisted until the 9th September, and by a further patch of leucoderma, the ninth in order of sequence which implicated the tissues of the anus.

On the 6th August, the thirty-third day after covering, the first cutaneous plaque was developed on the left side of the abdomen, in the blood of which, on microscopical examination, the trypanosoma was discovered. Between the abovementioned date and the 20th October, a period of 75 days, a succession of plaques, nineteen in number, made their appearance at intervals, and then ceased; for, from October 23rd, 1903, to February 29th, 1904, none were observed.

In fact, with the exception of two slight manifestations of disseminated urticaria, the first implicating the skin of the chest which persisted from the 4th to the 6th October, and a second which appeared on the right buttock and remained visible from the 7th to 9th October 1903, no other skin eruptions appeared during the first seven months of the case.

Œdema of the udder appeared on the 7th October and later it extended forward along the under-surface of the abdomen. In this instance, as is so commonly observed in Dourine animals, an alternate increase and diminution in the amount of the swelling and œdema took place, which was gradually absorbed in the former locality, but on the under-surface of the abdomen it persisted, and is still present more or less in February. On the 20th September the labia pudendi became slightly patent, and when at a later date, 21st October, the vaginal m. m. became much thickened and subsequently œdematous, a small amount of the m. m. protruded from the passage, and from long exposure became dry and discoloured.

After a period of 8 months had elapsed, the animal on examination exhibited no signs of weakness in the loins or hind limbs. The external inguinal glands were found to be normal on palpation, the sub-maxillary glands were rather hard and slightly larger than in health, but no nasal symptoms existed.

On several occasions in January 1904, localized sweating was observed to appear on the neck and shoulders, although at all times absent from other portions of the body.

In addition to the above symptoms, small leucodermic patches existed upon the tissues of the vulva and anus, and the trypanosomata appeared at intervals in the vaginal mucus.

The temperature of this animal has been recorded twice daily, morning and evening, since the date of its arrival at Muktesar on 31st May 1903, a period of over 8 months. A maximum of 39·2° C. was registered on 1st July, four days previous to the date of covering, and the minimum 37·0° C. on the 9th July 1903, four days after being covered by *Monarch*. Since the 5th July 1903, the evening records varied between 38·4° and 39·1° C, while those of the morning varied between 37·0° and 37·6° C., a difference of only 0·7 and 0·6 points respectively.

MARE VIII. · TABLE XXV

Showing the dates and days after covering on which some of the principal symptoms occurred.

Mare covered by *Monarch*	5th	July	1903	1st	day.
Vesicles on labia pudendi and vaginal m. m. appeared.	6th	,,	,,	2nd	,
Ulcers formed on vaginal m. m. and muco-purulent discharge from vagina appeared.	7th-8th	,,	,,	3rd–4th	
Ulcers on vaginal m. m. commenced to heal.	18th	,,	,,	14th	
Ulcers had all healed by	26th	,,	,,	22nd	,,
Trypanosoma first discovered in vaginal discharge.	21st		,,	17th	
Petechiæ appeared on vaginal m. m.	22nd	,,	,,	18th	,,
Appearance of first cutaneous plaque	6th	August	,,	33rd	,,
Eruption of the 18th cutaneous plaque	20th	October	,,	108th	,,
Vaginal orifice patent	28th	September	,,	86th	,,
Vaginal m. m. became œdematous	22nd	October	,,	110th	,,
Leucodermic patches appeared on vulva	1st	August	,,	28th	,,
Leucodermic patch appeared on anus	4th	September	,,	62nd	,,
Vesicles, pustules, etc., formed on vulva	9th	July	,,	5th	,,
Ulcers healed and symptoms disappeared	8th-20th	July	,,	14th—16th	,,
Vulva became thickened	31st	July	,,	27th	,,
Swelling persisted until	2nd	September	,,	60th	,,
Œdema on either side of vulva	3rd	,,	,,	61st	,,
Persisted until	9th	,,	,,	67th	,,
Œdema of udder appeared	7th	October	,,	95th	,,
Persisted until	22nd	,,	,,	110th	,,
Œdema under-surface abdomen appeared.	31st	,,	,,	119th	,,
Persisted	1st	February	1904	212th	,,
Disseminated urticaria appeared R chest	4th	October	1903	92nd	,,
Disseminated urticaria appeared R. buttock.	7th	,,	,,	95th	,,

MARE VIII.

TABLE XXVI

Showing the number of plaques, their situation, dates of appearance and disappearance, together with the duration of each respectively.

Serial No. of plaque.	Situation of plaque.	Appearance of plaque after first covering.	DATE OF APPEARANCE AND DISAPPEARANCE OF PLAQUES				DURATION OF PLAQUE.		Dimension of plaques in inches.	REMARKS.
			FIRST TIME.		SECOND TIME.					
			Appeared.	Disappeared.	Appeared.	Disappeared.	1st days	2nd days.		
		Days.	1903.	1903.	1903.	1903.				
1	L. side abdomen.	33	Aug. 6th	Aug. 11th	...	...	5	...	0·5 diam.	Urticarial, (9th) more prominent.
2	L. shoulder .	38	„ 11th	„ 13th	...	...	2	...	1·5 „	Urticarial, (12th) decreased.
3	R. ribs . .	41	„ 14th	„ 17th	...	...	3	...	0·75 „	Urticarial, (16th) pitted in centre.
4	L. side abdomen.	41	„ 14th	„ 15th	...	...	1	...	1·0 „	Urticarial, well raised in centre.
5	L. side abdomen.	41	„ 14th	„ 15th	...	...	1	...	1·0 „	
6	R. shoulder .	49	„ 22nd	„ 25th	...	...	3	...	2·5 x 0·75	Urticarial.
	R. thigh . .	49	„ 22nd	„ 27th	...	...	5	...	1·0 diam.	Urticarial, (25th) increased.

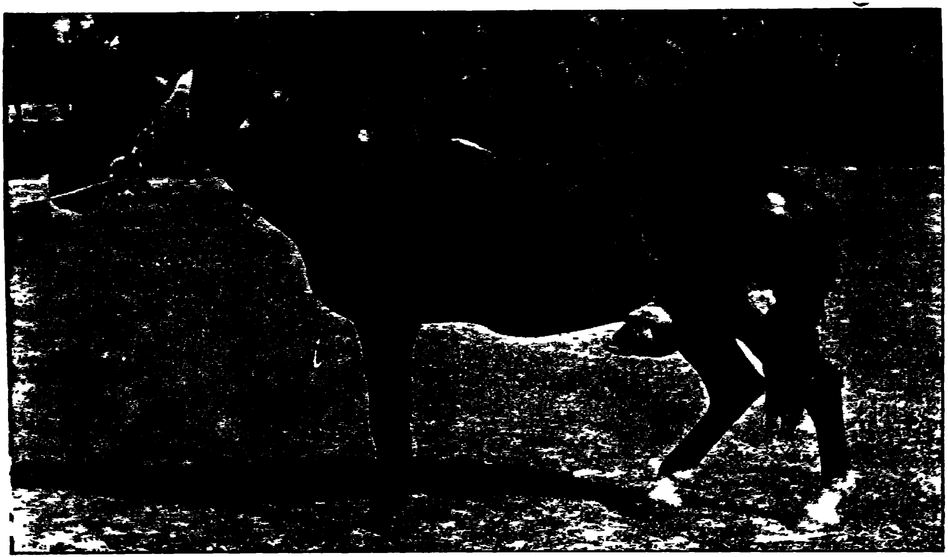
8	L. ribs . .	49	„ 22nd	„ 25th	...	...	3	...	2·0 „	Urticarial.
9	L. side abdomen.	59	Sep. 1st	Sep. 3rd	...	...	2	...	1·0 „	Urticarial, (2nd) decreased.
10	R. chest . .	83	„ 25th	Oct. 2nd	...	...	7	...	1·0 „	Urticarial.
11	R. hip . .	83	„ 25th	Sep. 30th	Oct. 7th	Oct. 19th	5	12	1·0 „	„ (17th) 3·0 diam. urticarial.
12	R. hip . .	83	„ 25th	„ 30th	„ 15th	„ 19th	5	4	1·0 „	Urticarial.
13	L. chest above spur vein.	86	„ 28th	Oct. 7th	...	...	9	...	2·0 „	„
14	R. chest . .	92	Oct. 4th	„ 21st	...	..	17	...	1·0 „	„ (17th) increased.
15	L. abdomen .	92	„ 4th	„ 7th	...	...	3	...	4·0 × 0·5	Urticarial, horse-shoe form.
	R. chest . .	92	„ 4th	„ 6th	...	...	2	...	...	Disseminated, urticaria.
16	R. ribs . .	95	„ 7th	„ 15th	...	...	8	...	2·0 diam.	Urticarial.
17	R. leg .	95	„ 7th	„ 15th	...	...	8	...	2·0 × 1·0	„ pitted.
	R. buttock .	95	„ 7th	„ 9th	...	...	2	...	...	Disseminated, urticaria.
18	R. buttock .	96	„ 8th	„ 16th	...	...	8	...	1·0 diam.	Urticarial.
19	L. shoulder .	108	„ 20th	Nov. 7th	...	...	18	...	1·5 „	Pitted in centre, (19th) more prominent, (20th) increased, (23rd) 3·0 × 2·5 well marked, (24th) increased lower extremity, 26th to 18th November decreased.
*										

* Two plaques Nos. 20 and 21 appeared during May and June 1904.

MARE VIII. TABLE XXVII.

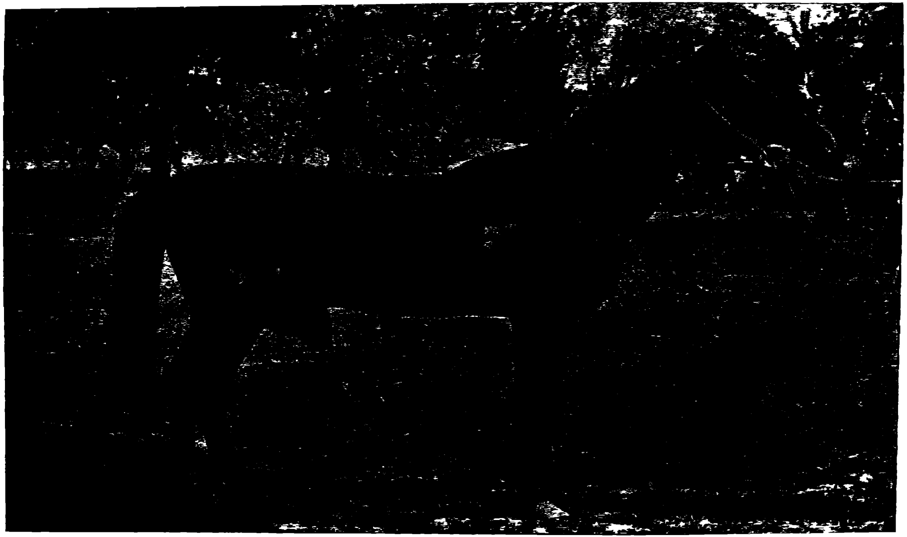
Showing the number of trypanosomata, with their presence in, and absence from, the vaginal mucus on the different dates mentioned.

Date	Interval from date of covering (5th July 1903).	Number of trypanosomata in specimens examined: Present.	Number of trypanosomata in specimens examined: Absent.	Number of days. Present.	Number of days. Absent.	Number of cover-glasses examined on each date	Remarks
1903.	Days						
July 7th 20th	3rd to 16th	..	*Nil*		14	2	
„ 21st	17th	6480	...	1	...	1	Vaginal discharge contained no red blood corpuscles.
July 22nd Aug 2nd	18th-29th	...	*Nil*		12	2	
Aug. 3rd	30th	48		2	...	1	
„ 4th	31st	43	..				
„ 5th-15th	32nd-42nd	...	*Nil*		11	2	Plaque No I appeared August 6th, No. II on 11th, and Nos III, IV and V on the 14th.
„ 16th	43rd	10		1	..	1	
„ 17th-24th	44th 51st	.	*Nil*	...	8	2	
„ 25th	52nd	1134	.	1		1	Plaques Nos VI, VII, VIII appeared August 22nd.
„ 26th-27th	53rd-54th		*Nil*		2	2	
„ 28th	55th	648		1	...	1	
„ 29th	56th	..	*Nil*		1	2	
„ 30th	57th	10	...	1	...	1	
„ 31st	58th	...	*Nil*	...	1	2	
Sep. 1st	59th	23	...	1	...	1	Plaque No. IX on September 1st.



SHAMSHER

Enlargement of sheath, oedema of undersurface of the abdomen together with certain cutaneous plaques



SHAMSHER

Cutaneous plaques on the right hind quarter [illegible]
— [illegible] and [illegible] in type

"MONARCH."

Globular and everted condition of the mucous membrane of the meatus-urinarius.

PLATE No. IV.

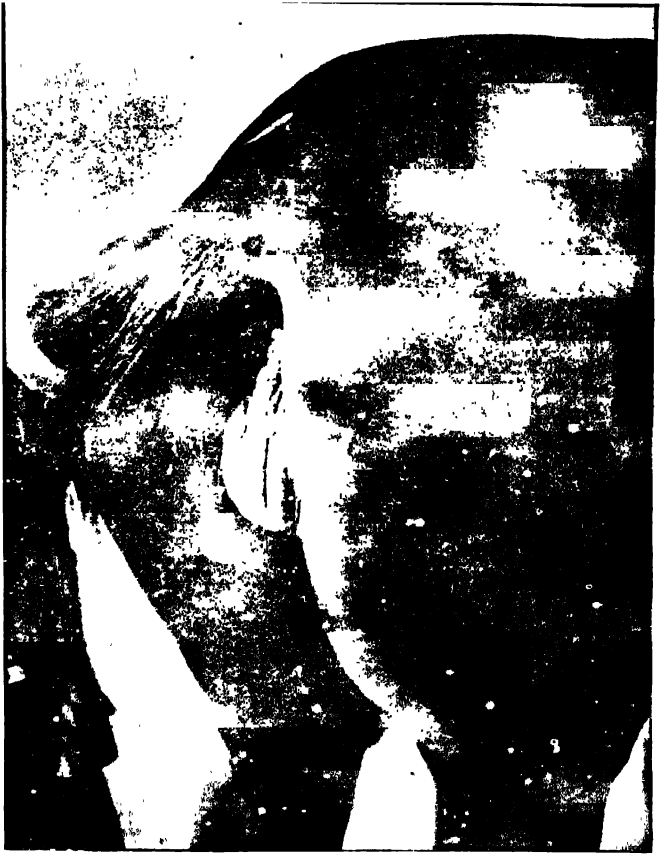


Photo-block

Survey of India Offices Calcutta [illegible].

MARE III.

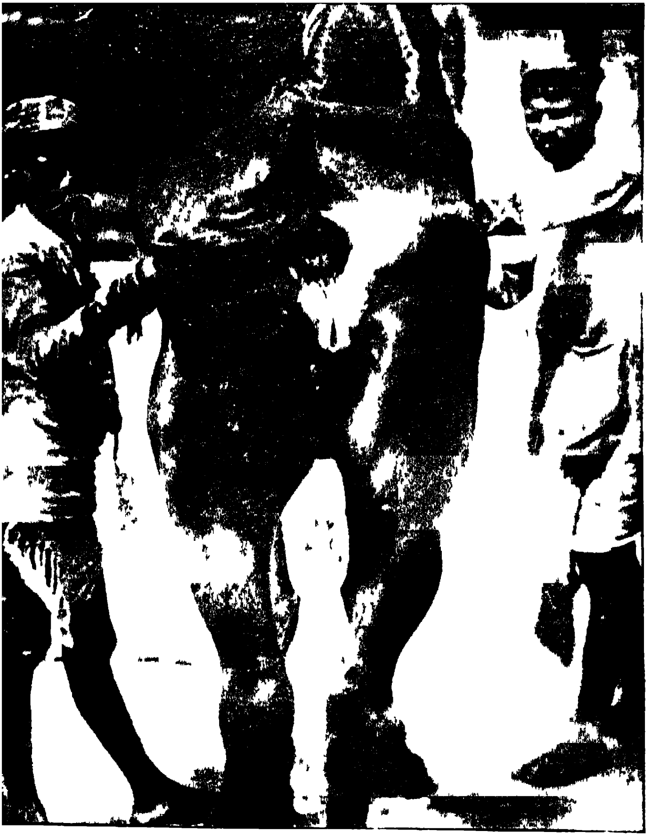
Unilateral enlargement of the left labium-pudendi.

P XV

MARE III

Cutaneous plaques in early case of Dourine.

PLATE No. VI



Survey of India Offices Calcutta 19[illegible]

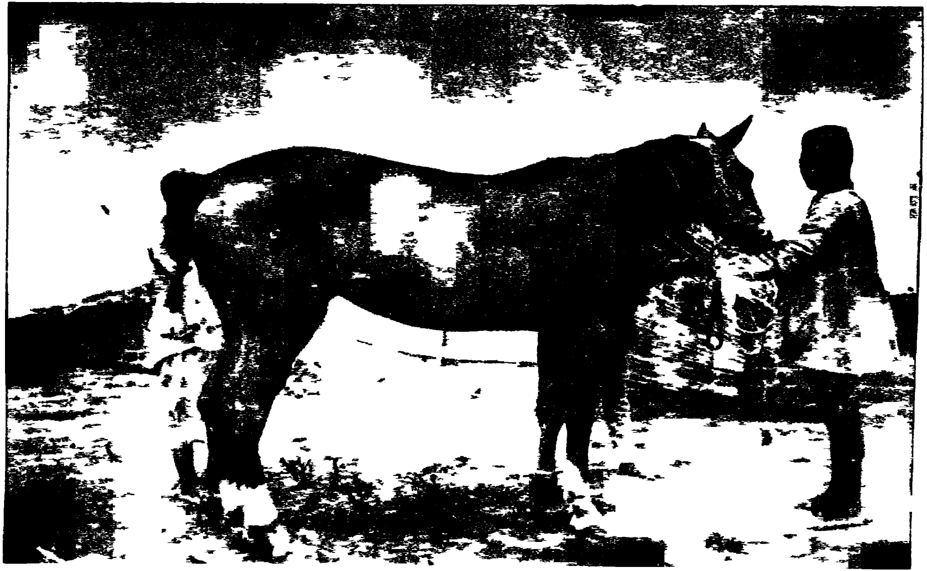
MARE III.

Leucoderma of vulva and surrounding tissues in an advanced case of Dourine.

PLATE No VII

MARE IV

Oedema involving tissues surrounding external genital organs spreading to perineum



MARE VII

Oedematous plaque showing raised ring at circumference with flat area within

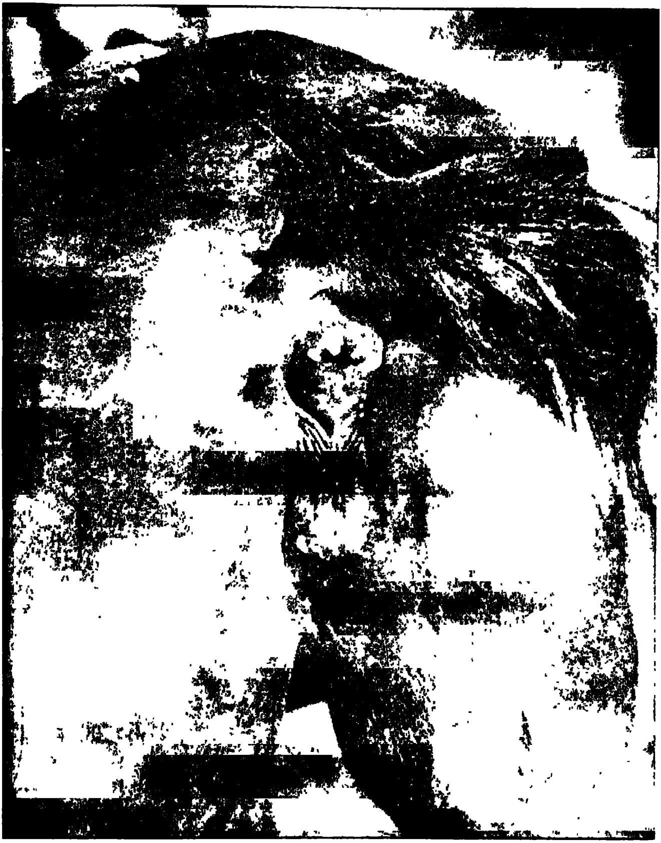
Plate No. IX

[illegible] Survey of India Offices, Calcutta, 1904.

"YADGIR"

Ulcer on penis. No trypanosomata were found on microscopical examination of scrapings from the ulcer.

PLATE No. X



MARE II

Leucoderma of vulva and surrounding tissues in an advanced case of Dourine.

PLATE No. XI

MARE V

Vesicular Exanthema of vulva. Appearance on the 11th day after covering.

PLATE XII

[illegible]

MARE VII

Vesicular Exanthema of vulva &c. Appearance on the 9th day after the infective covering.

PLATE No XIII

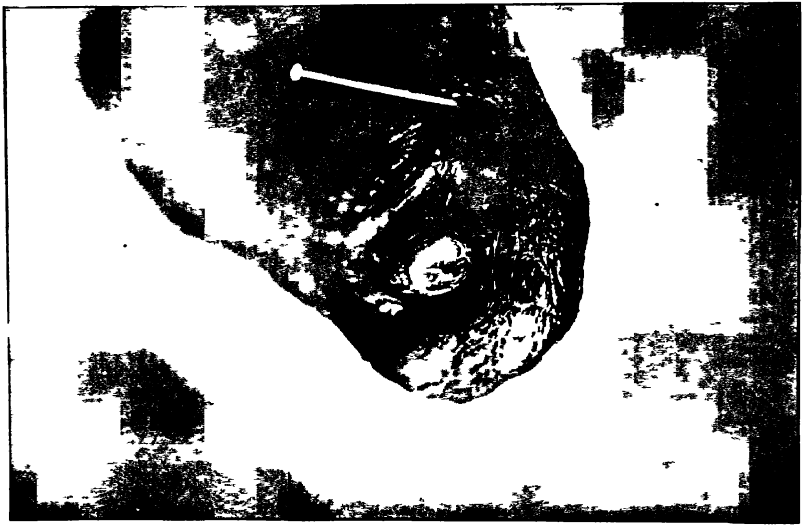
MARE VII

Leucoderma of vulva showing patches on the 212th day after the infective covering

PLATE X XIV

MARE VIII

Leucoderma of vulva showing patches on the 211th day after the infective covering,



PONY IX

Everted mucous membrane of meatus urinarius of pony which succumbed to **Surra** on the 19th day following inoculation The globular condition of the m m disappeared when the organ was amputated for the purpose of being photographed

PLATE No XVI

'VENDOR

Par [illegible] mosis [illegible] of Do[illegible]